EMERGENCY MEDICAL SERVICES PRE-HOSPITAL TREATMENT APPENDIX

Sixth Edition
6. 03 Official Version

COMPLETE TEXT

Effective July 1, 2006

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~ ~ ~ APPENDIX A - MEDICATIONS LIST~ ~ ~

MEDICATIONS LIST FOR STATEWIDE TREATMENT PROTOCOLS

Required Medications:

Activated Charcoal
Adenosine
Albuterol
Aspirin
Atropine
Atrovent Inhalation Aerosol
Calcium Chloride
Cetacaine Spray, Neo-Synephrine Spray, OR
2% Lidocaine Jelly
(To assist with nasotracheal intubation)
Dextrose D10, D25, and D50
Diazepam
Diltiazem HCL
Diphenhydramine
Dopamine
Epinephrine (1:1000 and 1:10,000)
Epi-Pen
Furosemide
Glucagon; Oral glucose (Glucola, Intra-glucose)
Lidocaine
Magnesium Sulfate
Midizolam
Morphine Sulfate
Naloxone
Nitroglycerin
Nitropaste (Nitro-Bid ointment)
Oxygen
Saline Flush
Sodium Bicarbonate
Terbutaline (subcutaneous)
Thiamine
IV Solutions (Normal Saline).

Interfacility Transfer Medications (in addition to required medications): aminophylline; antibiotics; anti-sepsis support medications; blood products; 10% Dextrose D10); digoxin; antidysrhythmics and pressor agents; anticonvulsants; glycoprotein IIb / IIIa inhibitors; heparin; insulin infusions; magnesium infusions; mannitol infusions; meperidine; benzodiazepines, anesthetics, or sedatives; paralytics; morphine sulfate infusions; nitroglycerin infusion; nitropaste; octreotide; potassium chloride infusions; sodium bicarbonate infusions, intravenous steroids; standard IV infusion fluids (1/2 NS, D5 1/2 NS, D5 1/4 NS, D5, LR, etc.); thrombolytic agents; parenteral nutrition (PPN or TPN) (via central or peripheral IV lines); other medications as approved by the OEMS medical director.

NOTE: Although the sending facility may have initiated medication(s), Paramedics MUST be familiar with all of the above medications that the patient may be receiving at the time of transfer. Reminder: interfacility medications are not to be initiated by Paramedics (except under special project waiver).

Optional Medications: **Check with your Region regarding optional medications.**

If medications on the Optional Medication list are required by the Region then all services operating in that region MUST stock these medications.

Amiodarone
Cyanide Antidote Kit (Amyl Nitrite, Sodium Nitrite, Sodium Thiosulfate)
Lorazepam
Metoprolol
Nerve Agent Antidotes- (Autoinjectors)
Pralidoxime
Tetracaine
IV solutions (D5W and LR)

APPENDIX B

COMFORT CARE / DNR ORDER VERIFICATION PROTOCOL

INTRODUCTION

Emergency medical services (EMS) personnel (refers collectively to Emergency Medical Technicians - EMTs and First Responders) are required to provide emergency care and to transport patients to appropriate medical facilities. EMS personnel are further required to provide treatment to the fullest extent possible, subject to their level of training. However, more and more patients, where it is medically appropriate, are opting not to be resuscitated. Many patients arrange with their physician, nurse practitioner or physician's assistant[1] for Do Not Resuscitate (DNR) orders; an order directing that the individual not be resuscitated in the event of cardiac or respiratory arrest. However, since there is currently no uniform mechanism to enable EMS personnel to recognize DNR orders in out-of-hospital settings, EMS personnel have been obligated to perform full resuscitative measures when encountering a patient unable to convey directions regarding medical treatment.

While it is clear within the emergency medical services' community that a patient has the authority to determine his/her medical treatment, EMS personnel have been unable to consider a patient's wishes regarding resuscitation in the out-of-hospital setting where the patient is either not conscious or not competent, due to the difficulty of ascertaining the validity of these wishes in the field under emergency conditions. Usually there is no ongoing relationship between the emergency medical services personnel and the patient. Emergency conditions require an immediate response and accurate identification. Authentication of individuals and documents is difficult, if not impossible, under emergency field conditions.

This Comfort Care / DNR ("CC/DNR") Order Verification Protocol is designed to allow EMS personnel to honor a DNR order in an out-of-hospital setting. To date, there are no standardized documents by which EMS personnel can verify a DNR order in the field, under emergency conditions. This protocol provides for a state-wide, uniform DNR order verification, approved by the Department of Public Health (DPH), that EMS personnel can instantly recognize as an acceptable verification of an existing DNR order; thus, allowing EMS personnel to honor the patient's request for no resuscitation and to provide the patient with palliative care in conformance with the Comfort Care protocol.

PURPOSE

The purpose of this protocol is to: (1) provide a verification/authentication of DNR orders to enable EMS personnel to honor DNR orders in out-of-hospital settings; (2) clarify the role and

[1] **Certain nurse practioners and physician assistants can issue DNR orders. Since not all nurse practioners and physician assistants are authorized to issue DNR orders, this protocol refers to authorized nurse practioners or authorized physician assistants to distinguish that group, which is authorized to sign the Comfort Care/Do Not Resuscitate Order Verification. Only those nurse practioners or physician assistants as defined below are authorized to sign the verification forms**

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responsibilities of EMS personnel at the scene and/or during transport of patients who have a current, valid CC/DNR Order Verification; (3) avoid resuscitation of patients who have a current, valid CC/DNR Order Verification; and (4) provide palliative/comfort care measures for patients with a current, valid CC/DNR Order Verification. This protocol is not intended to alter the standard of practice in issuing DNR orders in any way, but only to provide a standardized mechanism for the verification of the DNR order so that it may be recognized in out-of-hospital settings.

DEFINITIONS

For purposes of this protocol, the following are defined:

1. Attending Physician: A physician, licensed pursuant to M.G.L. c.112, §2, selected by or assigned to a patient, who is responsible for the treatment and care of the patient, in whatever setting medical diagnosis or treatment is rendered. Where more than one physician shares such responsibility, any such physician may act as the attending physician for purposes of this protocol.

2. Authorized Nurse Practitioner ("Authorized NP"): A registered nurse in the Commonwealth with advanced nursing knowledge and clinical skills as required by M.G.L. c. 112, §80B and 244 CMR 4.00 et seq. A nurse practitioner may write a DNR order, where this activity is agreed upon by the nurse practitioner and the collaborating physician in written practice guidelines (244 CMR 4.22[1]). It is the obligation of the nurse practitioner, the collaborating physician, and the institution where the nurse practitioner is practicing at the time the CC/DNR is issued to ensure that the nurse practitioner is authorized under his/her written practice guidelines to write a DNR order and by extension to sign the Comfort Care Verification form.

3. Authorized Physician Assistant ("Authorized PA"): A person who meets the requirements for registration set forth in M.G.L. c. 112, §9I, and who may provide medical services appropriate to his or her training, experience and skills under the supervision of a registered physician. The Division of Registration provides that a physician assistant may write DNR orders if: (1) his/her supervising physician determines that issuing a DNR order is within the competence of the physician assistant given the physician assistant's level of training and expertise (263 CMR 5.04 [1]), and (2) with regard to DNR orders, the physician assistant must consult with his/her supervising physician prior to issuance. A physician assistant may properly review and renew a preexisting DNR order without prior consultation with his/her supervising physician. Since the Comfort Care/Do Not Resuscitate Order Verification is a verification of an existing valid DNR order, the signing of the verification is comparable to the renewal of a preexisting DNR order. It is the obligation of the physician assistant, his/her supervising physician, and the institution where the physician assistant is practicing at the time the CC/DNR is issued to ensure

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that the physician assistant is authorized under his/her practice guidelines to write a DNR order and by extension to sign the Comfort Care Verification form.

4. Cardiopulmonary Resuscitation ("CPR"): Includes for purposes of this protocol, cardiac compression, artificial ventilation, oropharyngeal airway (OPA) insertion, advanced airway management such as endotracheal intubation, cardiac resuscitation drugs, defibrillation and related procedures.

5. Comfort Care / DNR Order Verification Bracelet ("bracelet"): A bracelet modeled after a hospital identification bracelet, which shall include the patient's name; date of birth; gender; date of expiration, if any, of the underlying DNR order; and the signature and telephone number of the attending physician, authorized nurse practitioner, or authorized physician assistant. The bracelet can only be issued to someone who has a valid CC/DNR Order Verification Form and must be issued by an attending physician, authorized nurse practitioner, or authorized physician assistant. Wearing the bracelet is voluntary; however, it is strongly recommended for individuals who remain mobile.

6. Comfort Care / DNR Order Verification Form ("form"): A standardized state-wide form for verification of DNR orders in the out-of-hospital setting, approved by the Department of Public Health. The CC/DNR Order Verification Form shall include the patient's name; date of birth; gender; address; date of issuance and date of expiration, if any, of the underlying DNR order; the signature and telephone number of an attending physician, authorized nurse practitioner, or authorized physician assistant; and the signature of the patient, guardian or health care agent. The CC/DNR Order Verification Form is the only DNR document that EMS personnel will be instructed to honor and can only be issued by an attending physician, authorized nurse practitioner, or authorized physician assistant.

7. Comfort Care / DNR Order Verification Protocol: A standardized state-wide patient care protocol to be followed by EMS personnel (EMTs and First Responders) when encountering a patient with a current, valid CC/DNR Order Verification Form and/or Bracelet. The protocol provides that the patient in respiratory or cardiac distress will receive palliative, comfort care consistent with the scope of the EMT's training and certification, but no resuscitative measures. The protocol applies to all emergency medical services personnel (Basic, Intermediate and Paramedic EMTs and First Responders) operating in an out-of-hospital setting and requires that they perform patient assessment and treatment in accordance with this protocol.

8. Emergency Medical Services Personnel: Any EMT certified pursuant to 105 CMR 170.000 et seq. and any First Responder as defined in 105 CMR 171.050.

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9. Guardian: An individual appointed by the court, pursuant to M.G.L. c. 201, §§ 6, 6A, or 6B, to make decisions for a person who is mentally ill, mentally retarded or unable to make or communicate informed decisions due to physical incapacity or illness, provided that the appointment as guardian includes the right to make health care decisions; or, a parent or other individual who is legally entitled to make decisions about the care and management of a child during his/her minority.

10. Health Care Agent: An individual authorized by a health care proxy to make health care decisions on behalf of the principal, pursuant to M.G.L. c. 201D. The authority of the health care agent becomes effective only upon a written determination of the attending physician, pursuant to M.G.L. c. 201D, § 6, that the principal lacks the capacity to make or to communicate health care decisions.

11. Life-sustaining procedure: Cardiopulmonary resuscitation, as defined in number 4 above. Life-sustaining procedures shall not include any medical procedure or intervention considered necessary by the attending physician, EMS personnel, or the medical control physician to provide comfort care or to alleviate pain.

12. Medical Control Physician: A physician designated within the EMS system to provide on-line and off-line medical direction to EMS personnel.

13. Palliative care: Comfort care that eases or relieves symptoms without correcting the underlying cause or disease.

14. Out-of-hospital: Any setting outside a hospital where EMS personnel may be called and may encounter patients with CC/DNR Order Verifications including, but not limited to, long-term care, hospice, assisted living, private homes, schools, inter-facility transport, and other public areas.

AUTHORITY

It is well settled in Massachusetts that individuals, while competent, have the right to determine the course of their medical treatment, including the right to refuse medical treatment and to make end of life decisions. Norwood Hospital v. Munoz, 409 Mass. 116, 564 N.E.2d 1017 (1991); Brophy v. New England Sinai Hospital, 398 Mass. 417, 497 N.E.2d 626 (1986); Lane v. Candura, 6 Mass. App. Ct. 377, 376 N.E.2d 1232 (1978); and Superintendent of Belchertown State School v. Saikewicz, 373 Mass. 728, 370 N.E.2d 417 (1977). Similarly, it is recognized that incompetent individuals have the same right to determine the course of their medical treatment as well as to refuse medical treatment. Brophy v. New England Sinai Hospital, supra; Saikewicz, supra; Matter of Spring, 380 Mass. 629, 405

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N.E.2d 115 (1980). See also, Matter of Dinnerstein, 6 Mass. App. Ct. 466, 380 N.E.2d 134 (1978); and Care and Protection of Beth, 412 Mass. 188, 587 N.E.2d 1377 (1992).

As an extension of the health profession into the field, the emergency medical system has the same obligation to recognize an individual's right to refuse medical treatment in an out-of-hospital setting, where the authenticity of the documentation can be validated.

Further authority: M.G.L. c. 111C and 105 CMR 170.000 et seq.; M.G.L. c. 111 § 201 and 105 CMR 171.000 et seq.

IMPLEMENTATION PROCEDURES

ELIGIBILITY: Anyone with a current valid DNR order is eligible for a CC/DNR Order Verification (Form and/or Bracelet), including minors.

A DNR order is an order, executed by a physician, authorized nurse practitioner, or authorized physician assistant, issued according to the current standard of care. The standard for issuing the DNR order is neither defined nor changed by this protocol. This protocol simply serves to verify, for EMS personnel, a DNR Order issued by a physician.

VALIDITY: To assure that a DNR order is recognized in any out-of-hospital setting, an attending physician, authorized nurse practitioner, or authorized physician assistant must provide a patient, who has a current DNR order, with a fully executed CC/DNR Order Verification. Pursuant to this protocol, EMS personnel will be instructed to honor a current valid CC/DNR Order Verification Form or CC/DNR Order Verification Bracelet. Patients without CC/DNR Order Verification Form or Bracelet will be resuscitated by EMS personnel in accordance with standard EMS protocols.

CONTENT: The CC/DNR Order Verification Form shall include:

- the name, date of birth, gender, and address of the patient;
- the name of the guardian or health care agent, if any;
- the signature of the patient or of the guardian or health care agent;
- verification by the attending physician, authorized nurse practitioner, or authorized physician assistant, of the existence of a current valid DNR order;
- the signature and telephone number of the attending physician, authorized nurse practitioner, or authorized physician assistant. If the signature is of an authorized nurse practitioner, or authorized physician assistant, the name (signature not required) of the collaborating or supervising physician shall also be included.;
- the issuance date and expiration date, if any, of the DNR order; and,
- authorization of EMS personnel to act pursuant to the Comfort Care protocol.

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The CC/DNR Order Verification Bracelet shall include:

- the name, date of birth, and gender of the patient;
- the expiration date of the DNR order, if any; and,
- the printed name, signature and telephone number of the attending physician, authorized nurse practitioner, or authorized physician assistant. If the signature is of an authorized nurse practitioner, or authorized physician assistant, the name (signature not required) of the collaborating or supervising physician shall also be included.

EXPIRATION: To the extent that the DNR order written by the physician has an expiration date, the CC/DNR Order Verification Form and CC/DNR Order Verification Bracelet, if issued, shall have an identical expiration date. This protocol does not prescribe an expiration date, but rather leaves the expiration date up to the physician, authorized nurse practitioner, or authorized physician assistant.

If the DNR order is revoked by the physician, authorized nurse practitioner, or authorized physician assistant, patient, guardian or authorized health care agent, the CC/DNR Order Verification Form and CC/DNR Order Verification Bracelet, if any, shall be similarly revoked.

ACCESS: This protocol is implemented solely through physicians. Only physicians can request and receive forms from the Department of Public Health; however a physician may distribute forms to an authorized nurse practitioner, or authorized physician assistant for whom the physician is a collaborating or supervising physician.

This protocol is activated when EMS personnel encounter a CC/DNR Order Verification Form or Bracelet. EMS personnel must:

- confirm the identity of the individual with the CC/DNR Order Verification Form or Bracelet; and,
- confirm that the CC/DNR Order Verification Form is an original and is current and valid[2] , or that the patient is wearing a current and valid CC/DNR Order Verification Bracelet.

If there is a CC/DNR Order Verification Form and/or a Bracelet, and either indicates a revocation or expiration of the CC/DNR Order Verification, EMS personnel shall resuscitate.

PATIENT CARE: Upon confirmation of a current, valid CC/DNR Order Verification Form or Bracelet, EMS personnel shall follow the following procedures:

[2] It is not the responsibility of the EMT to confirm the validity of the signature of the physician, authorized nurse practioner, or authorized physician assistant, nor is it the EMT's responsibility to determine whether the physician signing the verification is an attending physician, or the nurse practioner, or physician assistant authorized to sign the verification. Provided that the form is the original, is intact and is fully executed, it shall be presumed valid by the EMT unless there is information presented to the contrary.

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- If the patient is not in respiratory or cardiac arrest and the patient's heart beat and breathing are adequate, but there is some other emergency illness or injury, the EMS personnel shall provide full treatment and transport, as appropriate, within the scope of their training and level of certification.

- If the patient is in full respiratory or cardiac arrest, the EMS personnel shall not resuscitate, which means:
    - ⇒ do not initiate CPR;
    - ⇒ do not insert an oropharyngeal airway (OPA);
    - ⇒ do not provide ventilatory assistance;
    - ⇒ do not artificially ventilate the patient (mouth-to-mouth, bag valve mask, positive pressure, etc.);
    - ⇒ do not administer chest compressions;
    - ⇒ do not initiate advanced airway measures such as endotracheal intubation;
    - ⇒ do not administer cardiac resuscitation drugs; and,
    - ⇒ do not defibrillate.

- If the patient is **not** in full respiratory or cardiac arrest, but the patient's heart beat or breathing is inadequate, EMS personnel shall not resuscitate but shall provide, within the scope of their training and level of certification, full palliative care and transport, as appropriate, including:
    - ⇒ emotional support;
    - ⇒ suction airway;
    - ⇒ **administer oxygen**;
    - ⇒ application of cardiac monitor;
    - ⇒ control bleeding;
    - ⇒ splint;
    - ⇒ position for comfort;
    - ⇒ initiate IV line; and,
    - ⇒ contact Medical Control, if appropriate, for further orders, including necessary medications.
- If EMS personnel have any question regarding the applicability of the CC/DNR Order Verification with regard to any specific individual, the EMS personnel shall:
- verify with the patient, if the patient is able to respond;
- provide full treatment; or,
- contact Medical Control for further orders.

- If efforts are initiated prior to confirmation of the valid CC/DNR Order Verification, discontinue the following resuscitative measures upon verification:
    - ⇒ CPR;

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⇒ ventilatory assistance;
⇒ cardiac medications; and,
⇒ advanced airway measures.

Established IV lines and advanced airways should remain in place.

DOCUMENTATION: When a CC/DNR Order Verification Form and/or Bracelet is encountered by EMS personnel, it shall be documented. EMS personnel must also document palliative care provided to the patient and that the CC/DNR Order Verification Form or Bracelet is current and valid. Ambulance service personnel must document the presence of the CC/DNR Order Verification on the ambulance trip record.

REVOCATION: EMS personnel are not to honor any DNR request where the CC/DNR Order Verification Form or Bracelet, if present, is void or not intact. If there is a CC/DNR Order Verification Form and Bracelet, and either indicates a revocation, EMS personnel shall resuscitate.

- The CC/DNR Order Verification may be revoked by the patient at any time, regardless of mental or physical condition, by the destruction or affirmative revocation of the CC/DNR Order Verification, or by his or her direction that the CC/DNR Order

- Verification not be followed by out-of-hospital providers or be destroyed. Patients shall be instructed, upon revocation, to destroy the CC/DNR Order Verification From, CC/DNR Order Verification Bracelet, if issued, and the underlying DNR order.

- If an individual identifying him/herself as the health care agent or guardian revokes the CC/DNR Order Verification, EMS personnel shall resuscitate, as this raises an issue of doubt as to the validity of the CC/DNR Order Verification.

- EMS personnel, upon witnessing or verifying a revocation, shall communicate that revocation in writing to the hospital to insure its inclusion in the patient's medical record. Ambulance service personnel shall document the revocation on the ambulance trip record.

- **In any situation where EMS personnel have a good faith basis to doubt the continued validity of the CC/DNR Order Verification, EMS personnel shall resuscitate.**

Date: April 9, 1999

APPENDIX C: CESSATION OF RESUSCITATION

PURPOSE: 1) TO CLARIFY FOR EMS SERVICES AND THEIR EMTS WHEN RESUSCITATIVE MEASURES MAY BE WITHHELD FOR PATIENTS IN CARDIAC ARREST AND **2**) TO DEFINE WHEN EMTS CAN CEASE RESUSCITATIVE MEASURES ALREADY INITIATED.

Background and EMS Services' Training/Support Services Obligations:

Emergency Medical Technicians must begin or continue resuscitative measures for all patients in cardiac arrest except as indicated in this Protocol (also issued as Administrative Requirement (A/R) 5-515). If in doubt, begin resuscitative efforts.

All EMS services must provide appropriate training on management of death in the field, including legal, procedural, and psychological aspects; and access to support services.

EMS services and EMS personnel should be aware that the nursing staff of a health care facility, such as a skilled nursing facility, may need a physician order (including a medical control physician's order, if allowed by nursing home policy) to halt resuscitation attempts, even in the case of patients meeting EMS "obvious death" criteria, as set out below. Nursing staff and EMS personnel should come to a cooperative decision on continuation or termination of resuscitation; this process may include obtaining physician input and orders. If the medical professionals at the bedside are unable to reach agreement on attempting or terminating efforts, the presumption should be to continue resuscitative efforts and transport the patient to an emergency department.

I. EXCEPTIONS TO INITIATION OF RESUSCITATION

Other than in overriding circumstances such as a large mass-casualty incident or a hazardous scene, the following are the **only** exceptions to initiating and maintaining resuscitative measures in the field:

1. Current, valid DNR, verified per the Comfort Care Protocol.
2. Trauma inconsistent with survival
    a. Decapitation: severing of the vital structures of the head from the remainder of the patient's body
    b. Transection of the torso: body is completely cut across below the shoulders and above the hips
    c. Evident complete destruction of brain or heart
    d. Incineration of the body
    e. Cardiac arrest (i.e. pulselessness) documented at first EMS evaluation when such condition is the result of significant blunt or penetrating trauma and the arrest is obviously and unequivocally due to such trauma, EXCEPT in the specific case of arrest due to penetrating chest trauma and short transport time to definitive care
    (in which circumstance, resuscitate and transport)

3. Body condition clearly indicating biological death.
    a. Complete decomposition or putrefaction: the skin surface (**not** only in isolated areas) is bloated or ruptured, with sloughing of soft tissue, and the odor of decaying flesh.
    b. Dependent lividity and/or rigor: when the patient's body is appropriately examined, there is a clear demarcation of pooled blood within the body, and/or major joints (jaw, shoulders, elbows, hips, or knees) are immovable.

        Procedure for lividity and/or rigor: All of the criteria below must be established and documented in addition to lividity and/or rigor in order to withhold resuscitation:
            i. Respirations are absent for at least 30 seconds; **and**
            ii. Carotid pulse is absent for at least 30 seconds; **and**
            iii. Lung sounds auscultated by stethoscope bilaterally are absent for at least 30 seconds; **and**
            iv. Both pupils, if assessable, are non-reactive to light.

II. Cessation of Resuscitation by EMTs

Emergency Medical Technicians must continue resuscitative measures for all patients in cardiac arrest unless contraindicated by one of the exceptions below.

1. EMTs, certified at the Basic, Intermediate and Paramedic levels, may cease resuscitative efforts at any time when any "Exception to Initiation of Resuscitation" as defined in I., above, is determined to be present.

2. EMTs certified at the **Paramedic level only** may cease resuscitative efforts in an adult patient 18 years of age or older, regardless of who initiated the resuscitative efforts, without finding "obvious death" criteria **only** by the following procedure, and **only** if the EMS system's Affiliate Hospital Medical Director has approved of use of this procedure, as follows:
    a. There is no evidence of or suspicion of hypothermia; **AND**
    b. Indicated standard Advanced Life Support measures have been successfully undertaken (including for example effective airway support, intravenous access, medications, transcutaneous pacing, and rhythm monitoring); **AND**
    c. The patient is in asystole or pulseless electrical activity (PEA), and REMAINS SO persistently, unresponsive to resuscitative efforts, for at least twenty (20) minutes while resuscitative efforts continue; **AND**
    d. No reversible cause of arrest is evident; **AND**
    e. The patient is not visibly pregnant; **AND**
    f. An on-line medical control physician gives an order to terminate resuscitative efforts.

APPENDIX C: CESSATION OF RESUSCITATION

III. **Special Considerations and Procedures:**

1. In all cases where a decedent is left in the field, procedures must include notification of appropriate medical or medico-legal authorities.

2. EMS documentation must reflect the criteria used to determine obvious death or allow cessation of resuscitative efforts.

APPENDIX D: RESCUE AIRWAY PROTOCOLS (ADULT & PEDIATRIC)

EMERGENT AIRWAY PROTOCOL - ADULT

The **Emergent Airway Protocol** may be used in conjunction with any other protocol requiring airway control by those authorized to perform endotracheal intubation. When confronted with an airway that is evaluated as **unstable* (e.g., *unsuccessful intubation after a total of 3 attempts, unable to clear a foreign body airway obstruction, airway grading*** **(Figure 1 & 2)** ***suggests intubation unlikely*)**, advanced providers should utilize alternate equipment and training to gain control of the airway. Additionally, if the Emergency Medical Technician is unable to ventilate the patient, a determination should be made as to whether this inability is due to a manageable cause (e.g., *poor technique, equipment failure, mask size, mask seal*) and corrective measures applied, when applicable.

****Grade: Assessment of patient's airway to determine if there is expected difficulties with regard to intubation. i.e. anatomical alignment of the airway for ventilation."**

ASSESSMENT / TREATMENT PRIORITIES

1. Determine if the patient's airway is unstable*.
2. Ensure scene safety and maintain appropriate body substance isolation precautions.
3. Maintaining grading** **(Figure 1 & 2)** of the patient's airway.
4. Continue Bag-Valve-Mask (BVM) management with supplemental oxygen with oropharyngeal or nasopharyngeal adjuncts, (OPA or NPA) in place.
5. Initiate transport as soon as possible
6. Follow AHA & ARC guideline for management of the adult FBAO.

TREATMENT

INTERMEDIATE PROCEDURES

STANDING ORDERS

1. Arrange for **Paramedic** for intercept

2. After completing your assessment as listed above:
   a. Provide Rescue Airway Management.
   b. If BVM failure is the result of a manageable cause.
      - Apply countermeasures if applicable
   c. If the **patient can be ventilated, the** airway is unstable and **the treating Intermediate has been duly authorized by** the **Service's Medical Director in use of an alternative airway (LMA or Combitube):**
      - Insert the Laryngeal Mask Airway (LMA) or Combi-Tube

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d. Initiate IV Normal Saline enroute to the hospital ~~while in transport~~.
e. If patient's BLOOD PRESSURE drops below 100 systolic: Administer a 250 cc bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status

f. Notify receiving hospital.

3. After use of an emergent airway, the treating intermediate will:

a. **Document appropriate airway placement with all of the following that apply to the method used:**
- **Visualization of the tube passing through the vocal cords**
- **Appropriate bilateral breath sounds, lack of epigastic sounds**
- **Rise and fall of chest wall with ventilations**
- **Mist in the tube**
- **Rising pulse oximeter**
- **Positive ETCO2 device or Esophageal Device**
- **Note depth of device after securing**
- **Continued reassessment of placement**

b. **Fill out optional airway QA form as required by service**

PARAMEDIC PROCEDURES

STANDING ORDERS

1. After completing your assessment as listed above:
   a. Provide Rescue Airway Management.
   b. If BVM failure is the result of a manageable cause.
      - Apply countermeasures if applicable
   c. If the airway is unstable and the adult patient can be ventilated.
      - **In patients who require emergent intubation**
      - **Cannot be intubated by conventional means**
      - **The treating paramedic has been duly authorized by the Service's Medical Director in use of an alternative airway (LMA or Combitube)**

To facilitate intubation:

a. Administer Midazolam (~~Versed~~) 2.5 mg SLOW IV PUSH. Repeat if necessary to a total dose of 5.0 mg.
b. If intubation is unsuccessful:
- **Insert the Laryngeal Mask Airway (LMA) or Combi-Tube**

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d. If the airway is unstable and the patient cannot be ventilated perform a needle cricothyrotomy and provide oxygen via jet ventilation.

e. **Initiate IV Normal Saline (KVO) enroute to the hospital**

f. **If patient's BLOOD PRESSURE drops below 100 systolic: Administer a 250 cc bolus of IV Normal Saline, or titrate IV to patient's hemodynamic status**

g. **Cardiac Monitoring 12 lead ECG - Manage dysrhythmias per protocol**

h. Notify receiving hospital

2. After use of an emergent airway, the treating paramedic will:

a. Document appropriate airway placement with all of the following that apply to the method used:

- **Visualization of the tube passing through the vocal cords**
- **Appropriate bilateral breath sounds, lack of epigastic sounds**
- **Rise and fall of chest wall with ventilations**
- **Mist in the tube**
- **Rising pulse oximeter**
- **Positive ETCO2 device or Esophageal Device**
- **Note depth of device after securing**
- **Continued reassessment of placement**

b. Fill out optional airway QA form as required by service

APPENDIX D EMERGENT AIRWAY PROTOCOL - ADULT

Grade: Assessment of patient's airway to determine if there is expected difficulties with regard to intubation. i.e. anatomical alignment of the airway for ventilation.

Figure 1 depicts the Cormack & LeHane laryngoscopy classifications.

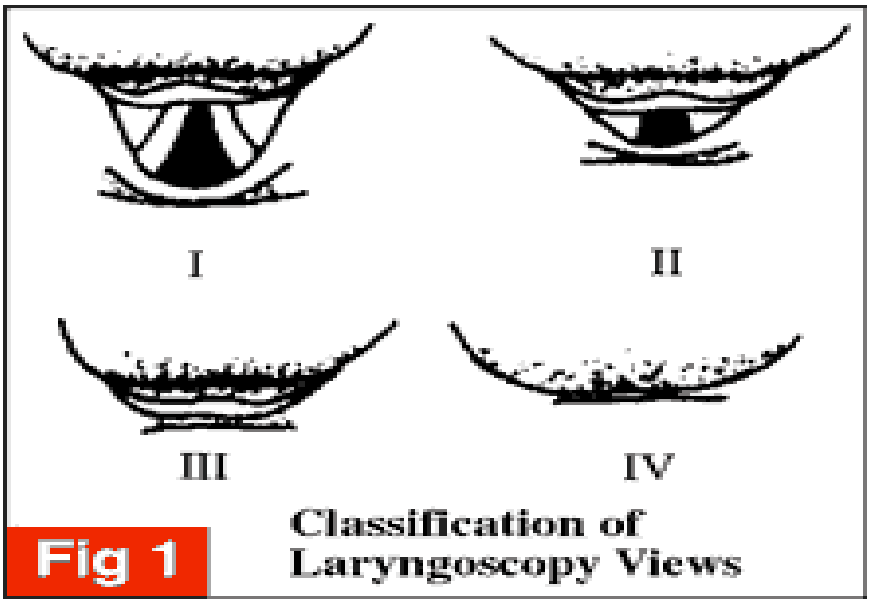


Figure 2 depicts the Mellampati system of airway grading, generally performed with patient sitting in full fowlers position with tongue extended.

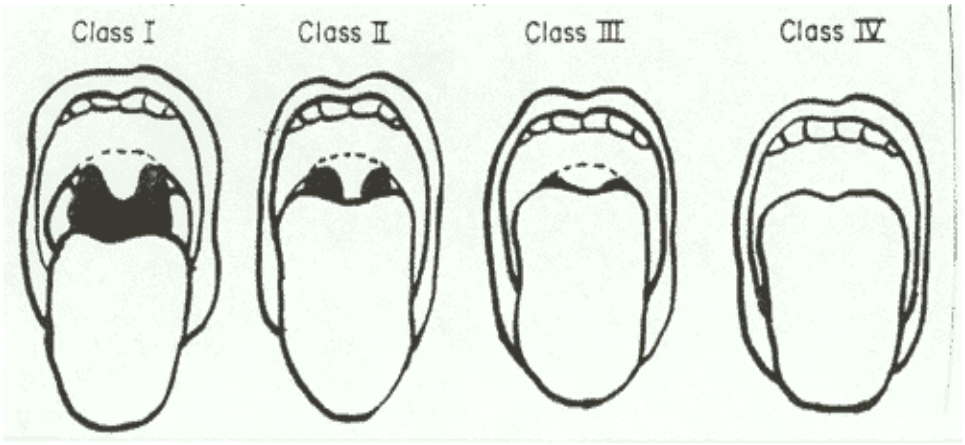


Fig 2

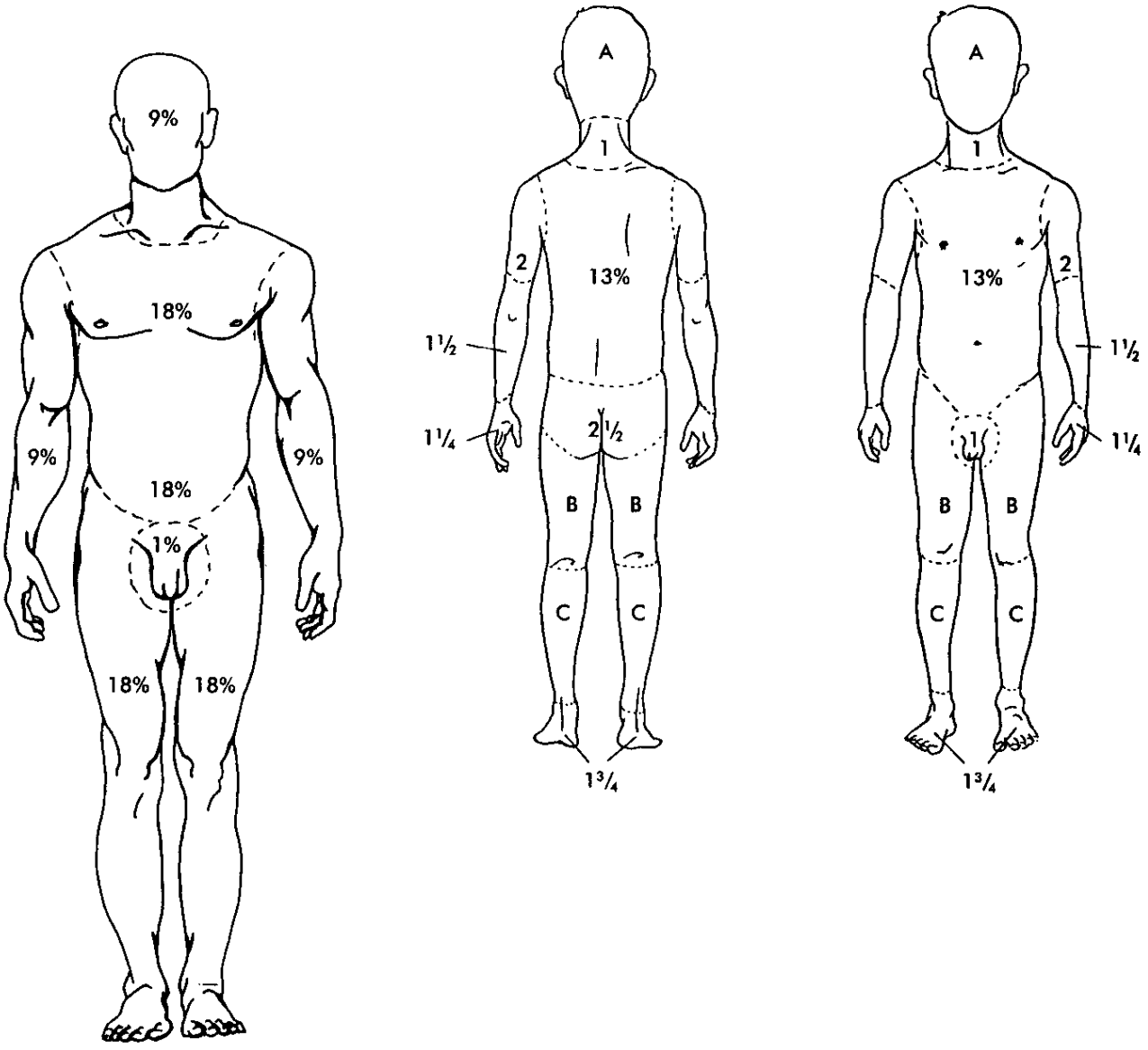
APPENDIX E - ENDOTRACHEAL TUBE SIZES

Suggested Sizes for Endotracheal (ET) Tubes:

Age	Internal Diameter of Tube in mm
Newborn	3.0
6 Months	3.5
18 Months	4.0
3 Years	4.5
5 Years	5.0
6 Years	5.5
8 Years	6.0
12 Years	6.5
16 Years	7.0

APPENDIX F - BURN CHART (ADULT & PEDIATRIC)

Lund & Browder Chart



Estimation of Burn Size (Children)

Area	Age 0	1 yr.	5 yr.	10 yr.	15 yr.
A - 1/2 of head	9 1/2 %	8 1/2 %	6 1/2 %	5 1/2 %	4 1/2 %
B - 1/2 of one thigh	2 3/4 %	3 1/4 %	4 %	4 1/4 %	4 1/2 %
C - 1/2 of one leg	2 1/2 %	2 1/2 %	2 3/4 %	3 %	3 1/4 %

APPENDIX G - TRAUMA SCORES

GLASGOW COMA SCORE	
Eye Opening:	
Spontaneous	4
To Voice	3
To Pain	2
None	1
Verbal Response:	
Oriented	5
Confused	4
Inappropriate Words	3
Incomprehensible Words	2
None	1
Motor Response:	
Obeys Command	6
Localizes Pain	5
Withdrawn (Pain)	4
Flexion (Pain)	3
Extension (Pain)	2
None	1
Total GCS Score:	3 - 15

Total GCS Points	
14 - 15	5
11 - 13	4
8 - 10	3
5 - 7	2
3 - 4	1

Revised Trauma Score

GCS	SBP	RR	Coded Values
13 - 15	>89	10 - 29	4
9 - 12	76 - 89	>29	3
6 - 8	50 - 75	6 - 9	2
4 - 5	1 - 49	1 - 5	1
3	0	0	0

SBP = Systolic Blood Pressure, RR = Respiratory Rate

APPENDIX G - TRAUMA SCORES

CALCULATION OF TRAUMA SCORE USING THE GLASGOW COMA SCALE

Glasgow Coma Scale

Eye Opening Response:	Spontaneous	4
	To Voice	3
	To Pain	2
	None	1
Best Verbal Response:	Oriented	5
	Confused	4
	Inappropriate Words	3
	Incomprehensible Sounds	2
	None	1
Best Motor Response:	Obey Command	6
	Localizes Pain	5
	Withdraws (Pain)	4
	Flexion (Pain)	3
	Extension (Pain)	2
	None	1
Total:	Apply this score to GCS portion of TS Below:	3 - 15

Trauma Score

GCS: (total points from above)	14 - 15	5
	11 - 13	4
	8 - 10	3
	5 - 7	2
	3 - 4	1
Respiratory Rate:	10 - 24 / Min.	4
	25 - 35 / Min.	3
	36 Min. or greater	2
	1 - 9 / Min.	1
	None	0
Respiratory Expansion:	Normal	1
	Retractive / None	0
Systolic Blood Pressure:	90 mm Hg or greater	4
	70 - 89 mm Hg	3
	50 - 69 mm Hg	2
	0 - 49 mm Hg	1
	No Pulse	0
Capillary Refill:	Normal	2
	Delayed	1
	None	0
Total Trauma Score:		1 - 16

Trauma Score	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Percentage Survival	99	98	96	93	87	76	60	42	26	15	8	4	2	1	0	0

APPENDIX G - TRAUMA SCORES

COMPONENTS OF THE PEDIATRIC TRAUMA SCORE

Component	Values +2	+1	-1
Size	≥ 20 kg	10 - 20 kg	≤ 10 kg
Airway	Normal	Maintainable	Unmaintainable
CNS	Awake	Obtunded	Coma
SBP	≥ 90 mm Hg	50 - 90 mm Hg	≤ 50 mm Hg
Open Wound	None	Minor	Major
Skeletal Injuries	None	Closed Fracture	Open or Multiple Fractures

CNS: Central Nervous System, SBP: Systolic Blood Pressure

APPENDIX H – REQUIRED SKILL

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APPENDIX I– PROCEDURES

The following conditions must be met in order for your service to provide the following treatment as listed below:

1. **Your Medical Director Must Have Authorized You As An EMT To Utilize This Portion Of The Protocol Based On Your Level Of Certification.**

2. **You Ambulance Service Must Have A Current Signed MOA With The Hospitals Served.**

3. **The Minimum Standard Training Component must be achieved as outlined by OEMS.**

APPENDIX I– PROCEDURES

BLS: a. Albuterol Administration via Nebulizer (Service Option)

ALS: a. Needle Cricothyroidotomy

4. The approved training program can be obtained from the OEMS website at:

http://www.state.ma.us/dph/oems/emttrain.htm

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APPENDIX I– PROCEDURES

ALS: A. *Needle Cricothyrotomy* (Approved for Paramedics Only)

The following is a general description of one of several accepted techniques being used throughout the Commonwealth, and may be used as a guideline. Due to differences in medical devices used by individual systems, the procedure may vary slightly. Refer to your local and regional guidelines for the technique and equipment used in your system.

Note: Appropriate body substance isolation precautions are required whenever caring for the trauma patient.

Indications: The indications for performing a needle Cricothyrotomy on a patient will be:

1. **The patient is in imminent danger of death.**
2. **No alternative airway device/maneuver has been successful.**
3. **The patient cannot be oxygenated or ventilated by any other means**

The local EMS Medical Director has appropriately trained and authorized the treating EMT-Paramedics.

Examples of types of patients potentially meeting the above criteria include (but are not limited to):

1. **Patients suffering traumatic arrest**
2. **Patients suffering multiple traumatic injuries**
3. **Patients suffering an upper airway obstruction**

Recognizing the time critical nature of the emergency, Needle Cricothyrotomy will be a Standing Order for patients/systems/paramedics meeting all of the above criteria.(See Also Rescue Airway Protocol Appendix)

A. Assemble and prepare oxygen tubing by cutting a hole toward one end of the tubing. Connect the other end of the oxygen tubing to an oxygen source, capable of delivering 50 psi or greater at the nipple, and assure free flow of oxygen through the tubing.

B. Place the patient in a sitting position.

C. Assemble a #12- or 14-gauge, 8.5 cm, over-the-needle catheter to a 6- to 12-mL syringe.

D. Clean the neck with an aseptic technique, using antiseptic swabs.

E. Palpate the cricothyroid membrane, anteriorly, between the thyroid cartilage and cricoid cartilage. Stabilize the trachea with the thumb and forefinger of one hand to prevent lateral movement of the trachea during the procedure.

F. Puncture the skin midline with the needle attached to a syringe, directly over the cricothyroid membrane (i.e., mid-saggital).

G. Direct the needle at a 45 degree angle caudally, while applying negative pressure to the syringe.

H. Carefully insert the needle through the lower half of the cricothyroid membrane, aspirating as the needle is advanced.

I. Aspiration of air signifies entry into the tracheal lumen,

J. Remove the syringe and withdraw the stylet while gently advancing the catheter downward into position, being careful not to perforate the posterior wall of the trachea,

APPENDIX I

Needle Cricothyrotomy (con't)

K. Attach the oxygen tubing over the catheter needle hub (you may use a 4.0 ET tube connector), and secure the catheter to the patient's neck.

L. Intermittent ventilation can be achieved by occluding the open hole cut into the oxygen tubing with your thumb for one second and releasing it for four seconds. After releasing your thumb from the hole in the tubing, passive exhalation occurs. Note: Adequate PaO2, can be maintained for only 30 to 45 minutes.

M. Continue to observe lung inflations and auscultate the chest for adequate ventilation.

Complications of Needle Cricothyrotomy

1. Asphyxia
2. Aspiration
3. Cellulitis
4. Esophageal perforation
5. Exsanguinating hematoma
6. Hematoma
7. Posterior tracheal wall perforation
8. Subcutaneous and/or mediastinal emphysema
9. Thyroid perforation
10. Inadequate ventilations leading to hypoxia and death

APPENDIX J - AIR MEDICAL TRANSPORT PROTOCOLS

Statewide Trauma Triage Guidelines for Air Medical Services September, 1997

Introduction:

The use of air medical services has become the standard of care for many critically ill or injured patients who require transport to specialized medical facilities such as Trauma Centers.

The purpose of these Guidelines is to establish a clinical framework for prehospital EMS personnel upon which to make decisions regarding when to access air medical support services. The following constitute the philosophical foundation for these Guidelines.

- EMS personnel should consider requesting ground advanced life support (ALS) and air medical support when operational conditions listed below exist and the following patient conditions are present;

- Patients with an uncontrolled or compromised airway should be brought to the nearest appropriate facility unless advanced life support (ALS) service (by ground or air) can intercept in a more timely fashion; and:

- Patients in cardiac arrest subsequent to blunt trauma should be taken to the nearest facility.

These guidelines have been established so that air medical support does not require prior Medical Control approval. However, Medical Control contact should be considered whenever appropriate for patient management issues.

OPERATIONAL CONDITIONS:

1. When a patient meets patient criteria defined below and scene arrival time to estimated arrival time at the nearest appropriate hospital, including extrication time, exceeds 20 minutes:
2. Patient location, weather or road conditions preclude the use of standard ground ambulance; or
3. Multiple casualties / patients are present which will exceed the capabilities of local hospital and agencies.

APPENDIX J - AIR MEDICAL TRANSPORT PROTOCOLS (Con't)

PATIENT CONDITIONS:

1. Physiologic Criteria:

a. Unstable Vital Signs
-Blood Pressure less than 90.
-Respiratory Rate greater than 30 or less than 10.

2. Anatomic Injury:

a. Evidence of Spinal Cord injury including paralysis or paresthesia.
b. Severe Blunt Trauma:
-head injury (Glascow Coma Scale of twelve [12] or less)
-severe chest or abdominal injury.
-severe pelvic injury excluding simple hip fractures.
c. Burns:
- greater than 20% Body Surface Area (BSA) second or third degree burns;
- evidence of airway or facial burns;
- circumferential extremity burns; or
- burns associated with trauma.
d. Penetrating injuries of head, neck, chest, abdomen or groin.
e. Amputations of extremities, excluding digits.

Special Conditions: The following should be considered in deciding whether to request air medical transport, but are **not** automatic or absolute criteria:

1. **Mechanism of Injury**
   a. -Motor Vehicle Crash:
      -patient ejected from vehicle.
      -death in same passenger compartment.
   b. Pedestrian struck by a vehicle and thrown more than 15 feet, or run over by a vehicle.

2. **Significant Medical History**
   a. -Age greater than 55 or less than 10.
   b. -Significant coexistent illness.
   c. -Pregnancy.

APPENDIX K - PROCESS FOR CHANGES TO THE STATEWIDE TREATMENT PROTOCOLS

All changes (any addition, deletion, or any other type of amendment) to the Massachusetts Statewide Pre-Hospital Treatment Protocols, including the ALS Interfacility Transfer Guidelines (Appendix N: A/R 5-509)[1] , require statewide dissemination and often require training of EMTs and Medical Control physicians prior to implementation. Therefore, to ensure a thorough review and orderly implementation, all protocol changes shall be approved and implemented on an annual basis, with the exception of those arising out of procedures described in Part B below.

Any protocol change must be approved pursuant to the following Procedures.

PART A
Procedures for Annual Protocol Changes

1. All requests for protocol changes shall be submitted by at least one Regional Medical Director to the Medical Services Committee on or before March 1, each year. The request for a protocol change shall include the following:
    a. A detailed description of the proposed change;
    b. A formal written endorsement from the Region(s) of origin for the proposed change;
    c. The results of a literature search documenting the risk/benefit of the proposed change in the pre-hospital arena. A literature search related to proposed changes in the interfacility transfer guidelines shall document the validity and accepted use of the proposed change in acute care facilities as well as in interfacility transport. All literature identified, both pro and con, shall be included, accompanied by a summary of the literature;
    d. Training standards for the proposed change, if appropriate.
    e. **Submit 1 written and 1 electronic version of changes to protocols in PC format**.

2. The Medical Services Committee shall review and make a recommendation regarding each proposed change to the protocols. Requests for protocol changes may be submitted to and reviewed by the Medical Services Committee throughout the year on a rolling basis; however, proposed changes shall only be submitted as a complete package for EMCAB Executive Committee review and approval after the March 1 submission deadline. Where training is required for implementation of the protocol change, the Medical Services Committee shall timely distribute the approved protocol changes to the Training Committee for its approval of the training component.

[1] Hereinafter the Massachusetts Statewide Pre-Hospital Treatment Protocols and the Interfacility Transfer Guidelines shall be referred to collectively as protocols.

APPENDIX K - PROCESS FOR CHANGES TO THE STATEWIDE TREATMENT PROTOCOLS (CON'T)

3. All protocol changes approved by the Medical Services Committee, with Training Committee approval of training if appropriate, shall be forwarded to the Executive Committee by March 15 of each year. The EMCAB Executive Committee shall review the proposed protocol changes and make a final determination at its April committee meeting.

4. A presentation of the approved changes shall be made at the first meeting of the full EMCAB following the April Executive Committee approval.

5. OEMS shall timely notify all providers of approved protocol changes and any requirements regarding implementation (i.e. training and implementation date).

PART B
Procedures for Protocol Changes Allowable Other Than on an Annual Basis

1. The State Medical Director shall have the discretion to implement immediate protocol changes when such emergency action is deemed by the Department to be necessary for the protection of public health and safety.
    a. The State Medical Director shall base such emergency action on a thorough review of relevant literature, any applicable national and/or state standard(s) and, when feasible, consultation with EMS Regional Councils, the Medical Services Committee and/or the EMCAB Executive Committee.
    b. When feasible, the State Medical Director shall convene an emergency meeting of the Medical Services Committee. The Medical Services Committee shall recommend any change to the protocols, and refer its recommendation and all supporting documents relating to the proposed change to the EMCAB Executive Committee for action. The EMCAB Executive Committee shall review the recommendation and make a final determination.
    c. OEMS shall, in its discretion, establish reasonable time frames for said implementation, particularly if a change requires training, and shall timely disseminate such a protocol change and any relevant implementation requirements.

APPENDIX K - PROCESS FOR CHANGES TO THE STATEWIDE TREATMENT PROTOCOLS (CON'T)

2. OEMS shall have the discretion to make changes to bring the protocols into compliance with national standards of care.
    a. This shall be done, when feasible, in consultation with Regional EMS Councils, the Medical Services Committee, and/or EMCAB Executive Committee.
    b. OEMS shall, in its discretion, establish reasonable time frames for said implementation, particularly if a change requires training, and shall timely disseminate such a protocol change and any relevant implementation requirements.

APPENDIX L - MULTIPLE CASUALTY INCIDENTS (MCI) TRIAGE

Each MCI/Disaster scene presents its own unique hazards and difficulties. This plan is a general guide to the management of MCIs. It should be understood that modifications may need to be made by command personnel on scene as such changes are needed.

A multiple casualty incident (MCI) is any situation where the number of sick or injured patients exceeds the available local, regional or state EMS system resources to provide adequate care in a timely manner to minimize injury and death. An MCI may be the result of a man made disaster or a natural event. Successful management of an MCI will require preplanning and organization of local, regional and state EMS, fire, law enforcement and civil defense resources. Hospital resources and specialized care services must also be included in preparing your MCI plan.

MCI management process is defined in the Incident Command System (ICS). In general, the Fire Department establishes the overall command and designates the incident commander (IC). **NOTE:** Other agencies may function as the IC, for example, Law Enforcement agencies at a crime scene or hostage situation. Other agencies may assist the IC. Clear precise inter-agency communication networks must be established for successful MCI management.

Levels of response to an MCI can be developed and will dictate which personnel and resources will be required at the scene. These levels include:

Level I Response: A localized MCI that can be managed by local EMS and Rescue personnel without the need for mutual aid from outside organizations.
Level II Response: An MCI that overwhelms or severely taxes local EMS and Rescue personnel that requires the need for mutual aid and interagency coordination. Typically a large number of patients are involved.
Level III Response: An MCI that overwhelms both local and regional EMS and rescue resources. Multiple patients spread over multiple sites are often involved. Significant inter-agency coordination is required.

TRIAGE

Triage is a special process of sorting patients by the severity of injury or illness to determine the need of emergency care and transportation. This needs to be a continuous process throughout the management of an MCI. The initial triage process should be performed by the first crew to arrive on scene and needs to be continuously reevaluated since the patient's triage status may change. Presently there are no national standard guidelines established for triage. Therefore, a suggested method of triage may be performed by either the METTAG (triage tagging system) or the START Field Guide (Simple Triage And Rapid Transportation) triage systems.

APPENDIX L - MULTIPLE CASUALTY INCIDENTS / TRIAGE (con't)

A suggested approach to treatment prioritization of victims is that found in the **METTAG** system. The treatment priorities are defined as:

Zero priority (BLACK): Deceased or live patients with obvious fatal and non-resuscitatable injuries

First priority (RED): Severely injured patients requiring immediate care and transport. (e.g., respiratory distress, thoracoabdominal injury, severe head or maxillofacial injuries, shock/severe bleeding, severe burns)

Second priority (YELLOW): Patients with injuries that are determined not to beimmediately life threatening. (e.g., abdominal injury without shock, thoracic injury without respiratory compromise, major fractures without shock, head injury/cervical spine injury, and minor burns)

Third priority (GREEN): Patients with minor injuries that do not require immediate stabilization. (e.g., soft tissue injuries, extremity fractures and dislocations, maxillofacial injuries without airway compromise and psychological emergencies)

The **START Field Guide** consists of a sixty (60) second patient assessment that evaluates ventilation, perfusion, and mental status to classify the victims as needing immediate or delayed transport or are non-salvageable or dead. This allows rescuers to quickly identify victims that are at greatest risk of early death or if they may require delayed transport. The METTAG or similar color coded tagging systems may be used as part of the START Field Guide.

SCENE ASSESSMENT AND TRIAGE PRIORITIES

1. Maintain universal blood and body fluid precautions.
2. The initial response team should assess the scene for potential hazards, safety and number of victims to determine the appropriate level of response.
3. Notify central dispatch to declare an MCI and need for interagency support as defined by incident level.

APPENDIX L - MULTIPLE CASUALTY INCIDENTS / TRIAGE (con't)

SCENE ASSESSMENT AND TRIAGE PRIORITIES (cont.)

4. Identify and designate the following positions as qualified personnel become available:
    - Incident Command Officer
    - Communications Officer
    - Extrication / Hazards Officer
    - Primary Triage Officer
    - Secondary Triage Officer
    - Treatment Officer
    - Loading/Transportation Officer
5. Identify and designate sector areas of MCI
    - Incident Command/Communication Sector
    - Support Sector (supplies and resources)
    - Staging Sector
    - Extrication / Hazards Sector
    - Triage Sector
        - Primary Treatment Sector
        - Secondary Treatment Sector
        - Transportation Sector
6. Post incident MCI Plan
    - Critical Incident Stress Debriefing (CISD)
    - Post incident Critique

BASIC, INTERMEDIATE AND PARAMEDIC MCI PROCEDURE SUMMARY

All EMT level personnel will eventually be involved in the management of an MCI. It is imperative that all EMTs implement the above incident command system (ICS) in all MCI situations. Every EMT must be aware and have a thorough knowledge of their particular role and responsibilities in the rescue effort.

Due to the many complexities of MCI/Disaster situations, it is recommended that all EMTs should participate and receive additional training in MCI/Disaster management.

APPENDIX M - PEDIATRIC VITAL SIGNS CHART

PEDIATRIC EMERGENCY REFERENCE

Age Years	Weight Kg	Resp Rate	Heart Rate	Systolic Blood Pressure	Resus. Mask	Self Inflating Bag	Laryngo-scope Blade	ET Tube Size mm	ET Tube Lip Line cm	Suction Cath. Fr.	Naso/Oro Gastric Tube	BP Cuff cm
Newborn	3 - 5	30-60	100 - 160	60-80	Infant 0-1	Pediatric	O Miller	3.0	9.0	6	8	5
6 mos.	7	25-40	90-120	80-100	1	Pediatric	1 Miller	3.5	10.5	8	8	5
1 yr.	10	20-30	90-120	80-100	1-2	Pediatric	1 Miller	3.5	10.5	8	8	5
18 mos.	12	20-30	80-120	80-110	2	Pediatric	1 Miller	4.0	11.5	10	8	5
3 yrs.	15	20-30	80-120	80-110	3	Pediatric	2 Miller	4.5	14.0	10	10	5
5 yrs.	20	18-24	70-110	80-110	3	Pediatric	2 Miller	5.0	15.0	10	10	7
6 yrs.	20	18-24	80-100	80-110	3	Pediatric	2 Miller	5.5	16.5	10	10	7
8 yrs.	25	18-24	70-110	80-110	3	Adult	2 Miller	6.0	18.0	14	10	9.5
10 yrs.	30	16-20	70-110	90-120	3	Adult	2 Miller	6.0	18.0	14	12	9.5
12 yrs.	40	16-20	60-110	90-120	4	Adult	2 Miller 2 Mac	6.5	19.5	14	12	9.5
14 yrs.	50	16-20	60-105	90-120	4-5	Adult	3 Miller 3 Mac	7.0	21.0	14	14	Adult
16 yrs.	60	16-20	60-80	80-120	4-5	Adult	3 Miller 3 Mac	7.5	21.5	14	14	Adult
18 yrs.	70	16-20	60-80	80-120	5	Adult	3 Miller 3 Mac	7.5	21.5	16	16	Adult

APPENDIX M - PEDIATRIC VITAL SIGNS CHART

PEDIATRIC EMERGENCY REFERENCE

PEDIATRIC TRAUMA SCORE

Component	+2	+1	-1
Size	>20kg	10-20kg	<10kg
Airway	Normal	Maintable	Unmaintable
CNS	Awake	Obtunded	Comatose
Systolic BP	>90 mmHg	90-60 mmHg	<50 mmHg
Open Wound	None	Minor	Major/Penetrating
Skeletal	None	Closed	Open/Multiple Fx

*** Pediatric Trauma Center if PTS is 8 or less.**

AIRWAY MANAGEMENT

ABCs, 100% Oxygen
Bag-Valve-Mask
Suction with rigid catheter
Oropharyngeal airway
Laryngoscope with blade
Endotracheal tube/Stylet
SaO_2
End-tidal CO_2

LEVEL OF RESPONSE

A =Alert
V =Responds to Voice
P =Responds to Pain
U =Unresponsive

PUPILLARY ASSESSMENT

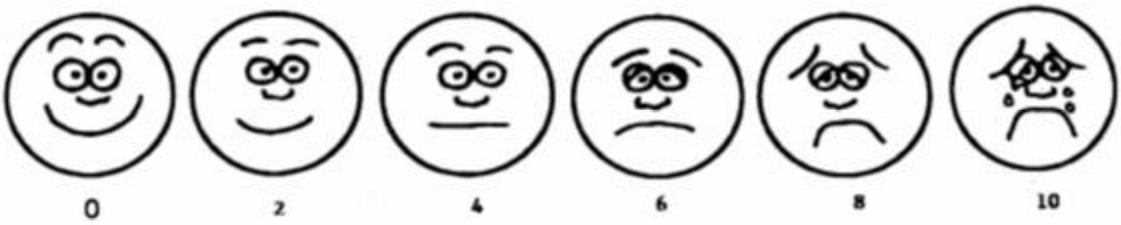
Pupil size in mm/reaction

N = Normal S =Sluggish F =Fixed

3mm 4mm 5mm 6mm 7mm 8mm

APPENDIX M PEDIATRIC EMERGENCY REFERENCE (con't)

Wong-Baker Faces Pain Rating Scale

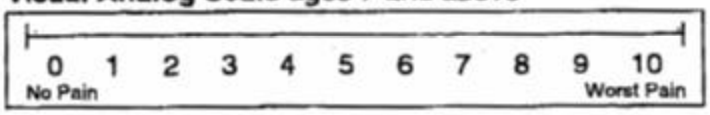


FLACC Scale

Categories	Scoring		
	0	1	2
Face	No particular expression or smile	Occasional grimace or frown, withdrawn, disinterested	Frequent to constant quivering chin, clenched jaw
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking, or legs drawn up
Activity	Lying quietly, normal position, moves easily	Squirming, shifting back and forth, tense	Arched, rigid or jerking
Cry	No cry (awake or asleep)	Moans or whimpers; occasional complaint	Crying steadily, screams or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging or being talked to, distractable	Difficult to console or comfort

Each of the five categories (F) Face; (L) Legs; (A) Activity; (C) Cry; (C) Consolability is scored from 0-2, which results in a total score between zero and ten.

Visual Analog Scale *ages 7 and above*



APPENDIX N - INTERFACILITY TRANSFER GUIDELINES (ALS) (CHANGES INCLUDED HERE)

EFFECTIVE DATE: JULY 1, 2006

Minimum Standards for Interfacility Transfers:

1. Staffing, Training

Minimum staffing at the Intermediate level requires one EMT-Basic and one EMT-Intermediate. Minimum staffing at the Paramedic level requires two EMT-Paramedics, except when a waiver is issued by the Department as follows:

a. to allow Paramedic level staffing with one EMT-Paramedic and EMT-Intermediate pursuant to 105 CMR 170.305(C)(3), or
b. to allow Paramedic level staffing with one EMT-Paramedic and one EMT-Basic pursuant to 105 CMR 170.305(C)(3)(a)(3) and in conformance with Administrative Requirement 5-255.

EMTs providing patient care during Interfacility Transfers must meet the following requirements as outlined in 105 CMR 170.000 et al:

a. current certification as an EMT in Massachusetts;
b. completion of Department approved supplemental training that is specific to and consistent with levels of certification of involved EMTs and includes
   - expanded roles and responsibilities
   - additional, approved treatment modalities, equipment, devices, and technologies; and
   - ambulance service policies and procedures regarding ALS Interfacility Transfers
c. has maintained current authorization to practice pursuant to the Affiliate Hospital Medical Director's review of clinical competency

Guidelines for approved ALS Interfacility Transfer training programs have been issued separately by the Department. It shall be the responsibility of the transferring ambulance service to ensure and to verify appropriate training of its personnel providing ALS Interfacility Transfers.

2. Affiliation Agreements; Medical Control

An ambulance service must be licensed at an ALS level by the Department to provide ALS care during Interfacility Transfers, and it must maintain an agreement for Medical Control, on-line medical direction and quality assurance with an Affiliate Hospital Medical Director, in accordance with 105 CMR 170.300.

3. Communications:

All communications with a Medical Control physician must be recorded.

4. Scope of Practice:

Section 170.360(A) of the EMS Regulations states, "No ambulance service or agent thereof shall transport a patient between health care facilities who is receiving medical treatment that is beyond the training and certification capabilities of the EMTs staffing the ambulance unless an additional health care professional with that capability accompanies the patient..." Depending on the individual's condition, there may be situations in which a physician or some other specialist's presence might be necessary; such determination shall be made by the on-line medical control physician in consultation with the physician at the sending hospital. All involved in this decision should consider whether the benefits of the transfer sufficiently outweigh the risks; a patient's greatest benefit may result from being transported by a standard IFT crew to a higher level of hospital care rather than delay for other transport
The scope of practice for each EMT level is defined (1) in regulation (sections 170.810, 170.820 and 170.840), (2) through established training programs approved by the Department, and (3) through the Statewide Treatment Protocols consistent with the Interfacility Transfer Guidelines.

The following are patient condition classifications and corresponding requirements for EMT personnel during ambulance transport:

a. Routine, scheduled transport; Patient clearly stable for transport with no requirement for airway management, IV maintenance and/or cardiac monitoring.

   Minimum Staffing: BLS licensed ambulance service; two EMT-Basics

b. Patient clearly stable for transport (as above) who has a "maintenance" IV running without additives; (e.g., cancer patient transported for radiation therapy, with unadulterated crystalloid IV solution running).

   Minimum Staffing: ALS-Intermediate licensed ambulance service; one EMT-Intermediate attending to patient care and one EMT-Basic driving

c. Patient with an acute or subacute problem, who is either completely or, at least, to the best of a facility's ability, stabilized; who has the potential to become less stable during transport. Instrumentation or medication running must be consistent with the Interfacility Transfer Guidelines.

   Minimum Staffing: ALS-Paramedic licensed ambulance service; two EMT-Paramedics; or, if the ambulance service has been issued the appropriate staffing waiver, one EMT-Paramedic and one EMT-Intermediate or EMT-Basic. The EMT with the highest level of certification must attend to patient care.

d. Patient with an acute problem with high potential to become **unstable**; Critical care patient with any other instrumentation or medication running that is not included in the Interfacility Transfer Guidelines.

   Minimum Staffing: Appropriate additional medical personnel (per 170.360(A)) must accompany the patient during transfer; any level of ambulance service licensure; two EMT-Basics. The ALS Interfacility Transfer Sub-Committee recommends that the referring hospital consider Critical Care Transport for such a patient. In the event that CCT is unavailable, medical personnel accompanying the patient must be able to manage all equipment and instrumentation associated with the patient's care and provide advanced resuscitative measures if needed.

e. Critical Care Transports (see 105 CMR 170.000, for regulatory requirements regarding critical care transport)

Under no circumstances shall EMTs function or be assigned to transfers beyond, or potentially beyond, the scope of their training and level of certification. The scope of practice for all EMTs is limited to the levels of EMT certification and training and by licensure level of the ambulance service by which they are employed.

If (1) a patient's medical condition necessitates immediate transport to another health care facility and (2) the patient's medical treatment during transport will exceed the level of licensure of the transferring ambulance service and/or level of certification of the transferring ambulance's personnel, and (3) the transferring facility will not provide appropriate additional personnel pursuant to 105 CMR 170.360(A), Critical Care Transport by ground or air should be employed.

The transferring facility may at any time opt to exceed these minimum requirements by transferring patients in BLS ambulances with appropriate medical personnel as defined in 170.360(A) or by Critical Care Ground or Air Transport.

5. Quality Assurance/Quality Improvement

a. Ambulance services providing ALS Interfacility Transfers shall be required to have quality assurance/quality improvement policies specific to ALS Interfacility Transfers in conjunction with both their affiliate hospital medical directors and their ambulance service medical directors, if any, and include at a minimum:
   - review of appropriateness of transfers, denials, and conformance with EMTALA regulations;

- review of critical skills (e.g., intubations, cardiac arrest management, IV therapy), and other measures of system function as deemed appropriate by The Department;
- steps for system improvement and individual remediation, available for Department review, of cases found to be deficient in critical interventions

b. Ambulance services shall report to the Department and the Affiliate Hospital Medical Director any violations of 105 CMR 170.000, this Administrative Requirement and/or prevailing treatment protocols as they relate to ALS Interfacility Transfers.

c. EMT skill maintenance and didactic knowledge will be continually assessed and appropriate measures taken to ensure quality of patient care by affiliate hospital medical directors and by ambulance service medical directors, if any.

Patient ALS Transfer Procedure

Once an ALS Interfacility Transfer has been deemed appropriate by the transferring ambulance service (see "Scope of Practice" above), paramedic staff, upon arrival at the transferring facility, will:

- receive a report from the staff of the transferring facility;
- assess the patient; and
- provide a concise, complete and accurate patient report to the Medical Control physician, according to the EMS service's policies and procedures.

The report should include, at a minimum, the following information:

a. Names of transferring and receiving facilities;
b. Patient's diagnosis;
c. Reason(s) for transfer;
d. Brief history of present illness and any intervention(s) which has occurred to date;
e. Pertinent physical findings;
f. Vital signs;
g. Current medications and IV infusions;
h. Presence of or need for additional medical personnel;
i. Anticipated problems during transport, if any;
j. Anticipated transport time; and
k. Staffing configuration of the transporting ambulance

NOTE: Complete copies of all pertinent medical records, including X-Rays, CT Scans, consultative notes and ECGs, as available, must accompany the patient to the receiving facility.

One crew member will begin patient preparation for transport while the other contacts the Medical Control physician for all transfers.

When necessary, the Medical Control Physician and paramedic will discuss with the transferring physician the orders for maintenance of existing and/or addition of new therapies according to the needs of the patient, within the scope of existing treatment protocols and EMT scope of practice. The Medical Control Physician will be responsible for all actions/interventions initiated by the EMS personnel during transport unless the referring physician accompanies the patient.

It is the responsibility of the Medical Control Physician to sign the EMS patient care report; a signature must be obtained as soon as practicable after the transfer.

If the transferring physician is unavailable, or the patient is unstable, the Medical Control Physician may recommend to the transferring facility additional therapies prior to the transfer of the patient in the interest of patient safety and quality care.

In some situations, consistent with the intent of EMTALA, the transfer of a patient not stabilized for transport may be preferable to keeping that patient at a facility incapable of providing stabilizing care. If the transferring facility cannot provide appropriate medical care or appropriately trained and experienced personnel to accompany the patient, alternative means of transfer, including Critical Care Transport, must be utilized. **The use of a local**

Emergency Ambulance Service is strongly discouraged in such a situation. All such responses must be reported by the ambulance service to DHCQ and the Affiliate Hospital Medical Director for review. It is primarily the responsibility of the referring physician and Medical Control Physician to determine the appropriate method of transferring an unstable patient.

When a facility sends its own staff with the patient during transfer (additional medical personnel) and the patient's condition deteriorates en-route, EMS personnel must contact the Medical Control Physician for appropriate intervention orders and notify the receiving facility of the change in patient status.

If the accompanying staff is an RN s/he will maintain patient care responsibility, functioning within his/her scope of practice and under the orders of the transferring physician. The Paramedic and the RN will work collaboratively in the provision of patient care. If the patient's condition deteriorates en-route, the Paramedic may assume full responsibility in conjunction with their Medical Control Physician for care that exceeds the RN's scope of practice and/or the transferring physician's medical orders. Prior to transfer with an RN, the referring physician must contact the service's Medical Control Physician and provide staffing rationale.

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If the accompanying staff includes a physician from the transferring facility, that physician shall be in charge of patient care. Prior to transfer, the transferring physician accompanying the patient must contact the service's Medical Control Physician and coordinate patient care between the physician-in-charge and the paramedic practicing within The Massachusetts EMS Pre-Hospital Treatment Protocols. Clear lines of command and responsibility shall be established prior to transport.

Interstate ALS Interfacility Transfers

Interstate transfers are permitted. Paramedics must obtain Medical Control through normal channels**,** through the Affiliation Agreement for Medical Control of the ambulance service for whom they are working. Appropriate provisions for re-contacting the Medical Control physician en-route, if necessary, should be made prior to departure from the transferring facility. If a transfer originates out of state and no contact with Medical Control Physician is possible, the transfer should be made at the BLS level only with appropriate additional personnel provided by the transferring facility.

Any of the following **Medications**, not currently part of the EMT Paramedic Statewide Treatment Protocols, may be used in the Interfacility Transfer mode, if they have been instituted by the sending facility. Unless otherwise stated, the transfer paramedics may **continue** and **monitor**, but not **institute** these medications and infusions, except as superseded by the Mass. EMS Pre-Hospital Treatment Protocols.

Interfacility Transfer Medications (in addition to required medications):
aminophylline;
antibiotics;
anti-sepsis support medications;
blood products;
10% Dextrose (D10);
digoxin;
antidysrhythmics and pressor agents;
anticonvulsants ;
glycoprotein IIb / IIIa inhibitors;
heparin;
insulin infusions;
magnesium infusions;
mannitol infusions;
meperidine;
benzodiazepines, anesthetics, or sedatives;
paralytics;
morphine sulfate infusions;
nitroglycerin infusion;
nitropaste;
octreotide ;
potassium chloride infusions;
sodium bicarbonate infusions,
intravenous steroids;
standard IV infusion fluids (1/2 NS, D5 1/2 NS, D5 1/4 NS, D5, LR, etc.);
thrombolytic agents ;
parenteral nutrition (PPN or TPN) (via central or peripheral IV lines);
other medications as approved by the OEMS medical director.

NOTE: Although the sending facility may have initiated medication(s), Paramedics MUST be familiar with all of the above medications that the patient may be receiving at the time of transfer. Reminder: interfacility medications are not to be initiated by Paramedics (except under special project waiver).

It is the responsibility of the service's affiliate hospital medical director to train personnel in the medications necessary to carry out IFT in their areas of responsibility.

Interfacility Equipment Monitoring allowed:

Ventilators
Central & Arterial lines (without hemodynamic monitoring)
Chest Tubes and accompanying hardware
Feeding tubes
Femoral Sheath(s) not in active use
NG Tubes
PIC Lines
Infusion pumps (including insulin infusion devices)
Bladder Irrigation
Internal Pacemakers

* Based upon accepted in-service training and certification and, as above, these skills are directed at the **continuation and monitoring** of these devices, and **not** their **institution** or **initiation**, which have been accomplished at the sending facility. (Note: Intra-aortic balloon pumps are specifically **excluded**, and will require appropriately trained/certified personnel for use during Interfacility Transfer).

APPENDIX O – SPECIAL PROJECTS

1. **OEMS supports the concept of pre-hospital clinical research projects. Any service that plan to conduct a study which will add to or alter the existing statewide treatment protocols, must apply for a special project waiver as outlined in the special project waiver administrative requirements (AR 5-211).**
2. **The AR 5-211 may be downloaded from the OEMS website at:**
   http://www.state.ma.us/dph/oems/admin.htm

Thank you.

APPENDIX P - APGAR SCORE

The APGAR scoring system provides a mechanism for documenting the newborn's condition at specific intervals after birth. The five objective signs are assessed at one (1) and five (5) minutes of age.

NOTE: The APGAR score should be documented, but should not be used to determine need for resuscitation, because resuscitative efforts, if required, should be initiated promptly after birth.

SIGN	0 POINTS	1 POINT	2 POINTS
HEART RATE	ABSENT	< 100	> 100
RESPIRATORY EFFORT	ABSENT	WEAK CRY	STRONG CRY
MUSCLE TONE	FLACCID	SOME FLEXION	ACTIVE MOTION
REFLEX IRRITABILITY	NO RESPONSE	GRIMACE	COUGH, SNEEZE OR CRY
COLOR	BLUE, PALE	BODY: PINK EXTREMITIES: BLUE	FULLY PINK

APPENDIX Q THE BOSTON STROKE SCALE (BOSS)*:

(Modified from the Cincinnati Stroke Scale)

FACIAL DROOP (*Patient shows teeth or smiles)*

Normal: Both sides of face move equally

Abnormal: One side of face does not move as well as the other

ARM DRIFT (*Patient closes eyes and extend both arms straight out for 10 seconds.)*

Normal: There is no drift at all or both arms drift the same

Abnormal: One arm drifts/moves down compared to the other arm or one arm noticeably weaker than the other.

SPEECH *(Score first attempt: Patient repeats, e.g. "The sky is blue in Boston.")*

Normal: The Patient says the correct words with no slurring of words on first attempt.

Abnormal: The patient slurs words, says the wrong words or is unable to speak on first attempt

APPENDIX R FIBRINOLYTIC CHECKLIST

***Note:** This checklist is intended only as a tool for the pre-hospital identification of patients with significant contraindication(s) to the administration of fibrinolytics in the acute ST elevation M.I. (STEMI) setting. It is not intended to be a comprehensive list of all factors to be considered prior to administration of these agents. Significant contraindications may warrant the triage of these patients to facilities capable of percutaneous intervention (PCI).

Date: _____ Time: _____ Medic Unit: _____ Receiving Facility: _____

Patient Name: _____ Age: _____ Est. Wt.: _____lbs (_____kgs)

Duration of Chest Pain*: _____ Hours _____ Minutes *(>20 minutes and <12 Hours)

Exclusions (**? = unknown)**

1. Is patient unconscious or exhibiting altered mental status? **Yes / No**
2. Is patient on oral anticoagulants? (e.g., Coumadin) **Yes / No / ?**
3. Is blood pressure consistently > 180/110 mm Hg.? **Yes / No**
4. GI or GU bleeding, or known bleeding condition, in past 2 weeks? **Yes / No / ?**
   (e.g., actively bleeding, black tarry stool, hematemesis, hematuria?)
5. Any history of esophageal varices or active peptic ulcer? **Yes / No / ?**
6. Recent major surgery, major trauma (incl. CPR) within last 2 weeks? **Yes / No / ?**
   (including open biopsy, puncture or catheterization of chest/neck vessel?)
7. History of AAA or known dissection or aneurysm of aorta? **Yes / No / ?**
   (pain radiating through to the back?)
8. Any history of CVA, TIA, cerebral bleeding, aneurysm, AVM or brain tumor? **Yes / No / ?**
9. Pregnancy? **Yes / No / ?**
10. Treatment with fibrinolytics in past 6 months? **Yes / No / ?**
    (**OR -** known allergy to fibrinolytic drugs in the past)

12-lead ECG: Time obtained: _____ Results: _____

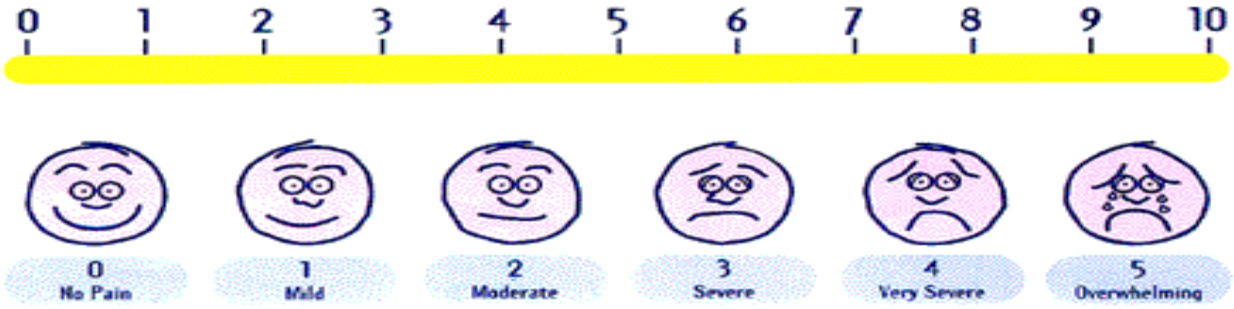
Compatible with AMI? (ST ↑ >1mm in 2 contiguous leads) **Yes / No / ?**

Is patient likely to be eligible for Fibrinolytic Therapy?
Yes / No / ?

Receiving Physician: _____ Time: _____

Paramedic No. _____ Signature: _____

APPENDIX S ADULT PAIN MANAGEMENT ASSESSMENT GUIDE



PAIN ASSESSMENT GUIDE

TELL ME ABOUT YOUR PAIN

W ords to describe pain

aching	throbbing	shooting
stabbing	gnawing	sharp
tender	burning	exhausting
tiring	penetrating	nagging
numb	miserable	unbearable
dull	radiating	squeezing
crampy	deep	pressure

Pain in other languages

itami	Japanese	dolor	Spanish
tong	Chinese	douleur	French
dau	Vietnamese	bolne	Russian

I ntensity (0-10)
If 0 is no pain and 10 is the worst pain imaginable, what is your pain now? ... in the last 24 hours?

L ocation
Where is your pain?

D uration
Is the pain always there?
Does the pain come and go? (Breakthrough Pain)
Do you have both types of pain?

A ggravating and Alleviating Factors
What makes the pain better?
What makes the pain worse?

How does pain affect

sleep	energy	relationships
appetite	activity	mood

Are you experiencing any other symptoms?

nausea/vomiting	itching	urinary retention
constipation	sleepiness/confusion	weakness

Things to check
vital signs, past medication history, knowledge of pain, and use of noninvasive techniques

REFERENCES: Jacox A, Carr DB, Payne R, et al. Management of Cancer Pain. Clinical Practice Guideline No. 9. AHCPR Publication No. 94-0592. Rockville, MD: Agency for Health Care Policy and Research, U.S. Department of Health and Human Services, Public Health Service, March 1994. Wong, D. and Whaley, L. Clinical Handbook of Pediatric Nursing, ed. 2. The C.V. Mosby Company, St. Louis, 1986, p. 372.

http://mayday.coh.org/pain_assessment.asp

City of Hope and
Beckman Research Institute
1500 E. Duarte Road
Duarte, CA 91010-3000
1-800-423-7119
www.cityofhope.org

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APPENDIX T NERVE AGENT DOSING & REFERENCE TABLES

NOTE: Be familiar with other agents. They may present with similar Signs & Symptoms as those of Nerve Agents.

Table Signs and Symptoms for Specific Agents

Sign/Symptom	Nerve Agent	Vesicant	Pulmonary Agent	Cyanide
Immediate cardiac arrest	X			X
Sudden syncope, seizures, or coma	X		X	X
Apnea without cyanosis				X
Cyanosis	X		X	X
Immediate difficulty breathing, wheezing, or gasping			X	
Rapid respiratory rate				X
Delayed dyspnea (hours)			Phosgene Phosgene oxide	
Nausea, vomiting, diarrhea, abdominal cramps	X			
Fasciculations and twitching	X			
Copious sweating	X			
Copious oral,nasal, or pulmonary secretions	X	X	X	
Incontinence	X			X
Pinpoint pupils	X			
Dilated pupils	X			X
Immediate eye and nose irritation		Lewisite	Chlorine Phosgene Phosgene oxide	
Delayed eye irritation (2-12 hrs)		Mustard		
Immediate skin burns, nonthermal		Lewisite		
Delayed skin burns, nonthermal		Mustard		
Exposure to burning plastic				X
Exposure to hot chlorinated hydrocarbons			Phosgene Phosgene oxide	
Bitter almond odor				X

NOTE: In a mass casualty incident, use triage cards as appropriate, always checking patients for evidence of prior triage and treatment.

APPENDIX T NERVE AGENT DOSING & REFERENCE TABLES

SEVERITY	CHOLINERGIC AGENT SIGNS & SYMPTOMS	ADULT TREATMENT STANDING ORDERS
Mild	Runny nose Cough Pupils may be pinpoint Eye pain Lacramation	Decontaminate Administer 100% oxygen Administer **One** Mark I kit IM **OR** 2 mg atropine IM **only &** either: 600 mg IM pralidoxime **OR** 1 gm IV pralidoxime
Moderate	Runny nose Cough Sweating, twitching Nausea, abdominal cramping Weakness Localized sweating (seen with dermal exposure) Eye pain, trouble seeing Wheezing, shortness of breath	Decontaminate Administer 100% Administer **Two** Mark I kits IM **OR** 4 mg atropine IM **only &** either: 600-1200 mg IM pralidoxime **OR** 1 gm IV pralidoxime
Severe	All the above plus: Vomiting Diarrhea Drooling, copious respiratory secretions Significant weakness Seizures Decreased level of consciousness Apnea	Decontaminate Administer 100% oxygen Administer **Three** Mark I kits IM **OR** 6 mg atropine IM **only &** either: **1200 -**1800 mg IM pralidoxime **OR** 1 gm IV pralidoxime **&** *one of the following:* Diazepam 10 mg IM Autoinjector (CANA kit) **OR**, Diazepam 10 mg IM/IV **OR**, Lorazepam 2-4 mg IM/IV **OR**, Midazolam 5-10 mg IM/IV

NOTE: Dermal absorption of nerve agents may lead to delayed symptom onset up to 18 hours after exposure. Initial symptoms/signs may only be local such as localized fasciculation and sweating.

NOTE: Do not administer an adult dose to a child < 50 kg

Pediatric Dosing for Nerve Agent Exposures

Kg		Atropine 0.02-0.05mg/kg	Pralidoxime 20-40mg/kg	Midazolam 0.1mg/kg	Diazepam 0.25 mg/kg	Lorazepam 0.05-0.2 mg/kg
1	Premie	0.1 mg	20-40 mg	0.05-0.1 mg	0.25 mg	0.05-0.2 mg
2	Newborn	0.1 mg	40-80 mg	0.1-0.2 mg	0.5 mg	0.1-0.4 mg
5	3 mos	0.1-0.25 mg	100-200 mg	0.25-0.5 mg	1.25 mg	0.25-1 mg
10	12 mos	0.2-0.5 mg	200-400 mg	0.5-1 mg	2.5 mg	0.5-2 mg
15	2-3 yrs	0.3-0.75 mg	300-600 mg	1-1.5 mg	3.75 mg	0.75-3 mg
20	4-7 yrs	0.4-1 mg	400-800 mg	2 mg	5 mg	1-4 mg
25	6-9 yrs	0.5-1.25 mg	500 mg-1 g	2.5 mg	6.25 mg	1.25-4 mg
30	7-11 yrs	0.6-1.5 mg	600 mg-1 g	3 mg	7.5 mg	1.5-4 mg
35	8-13 yrs	0.7-1.75 mg	700 mg-1 g	3.5 mg	8.75 mg	1.75-4 mg
40	9-14 yrs	0.8-2 mg	800 mg-1 g	4 mg	10 mg	2-4 mg
45	10-16 yrs	0.9-2 mg	900 mg-1 g	4.5 mg	10 mg	2.25-4 mg
50	11-18 yrs	1-2 mg	1 g	5 mg	10 mg	2.5-4 mg
55	12-18 yrs	1.25-2 mg	1 g	5 mg	10 mg	2.75-4 mg
60	13-18 yrs	1.5-2 mg	1 g	5 mg	10 mg	3-4 mg
65	14-18 yrs	2 mg	1 g	5 mg	10 mg	3.25-4 mg
70	16-18 yrs	2 mg	1 g	5 mg	10 mg	3.5-4 mg

APPENDIX T NERVE AGENT DOSING & REFERENCE TABLES

PEDIATRIC ATROPENS

Pediatric Atropine Dosing for Nerve Agent Toxicity Using Pediatric Atropens

Weight	Mild	Moderate	Severe
15-40 lb (7-18 kg)	1 x 0.5 mg Atropen	1 x 1 mg Atropen	3 x 0.5 mg Atropen
40-90 lb (18-41 kg)	1 x 1 mg Atropen	1 x 2 mg Atropen	3 x 1 mg Atropen
>90 lb (41 kg)	1 x 2 mg Atropen	2 x 2 mg Atropen	3 x 2 mg Atropen

Note: Pralidoxime reduced dose pediatric autoinjectors are not available

~ ~ ~

ADULT AUTOINJECTORS

Pediatric Dosing for SEVERE Nerve Agent Toxicity Using Adult Autoinjectors

(I.E. seizures, hypotension, coma, cardiac arrest)

Use only if Pediatric Atropen or when Atropine/Pralidoxime vials are not available

Approximate age	Approximate weight	Number of autoinjectors (each type)	Atropine dosage range (mg/kg)	Pralidoxime dosage range (mg/kg)
3-7 yrs	13-25 kg	1	0.08-0.13	24-46
8-14 yrs	26-50 kg	2	0.08-0.13	24-46
>14 yrs	>51 kg	3	0.11 or less	35 or less

- **NOTE: Mark I kits are not approved for pediatric use, however, they should be used as initial therapy in circumstances for children with severe life-threatening nerve agent toxicity when IV therapy is not available. This assumes 0.8 inch needle insertion depth.**
- **NOTE: Potential high dose of atropine and pralidoxime for age/weight. However, these numbers are within the general guidelines recommended for the first 60-90 minutes of therapy after a severe exposure.**
- **NOTE: Administer injection in large muscle mass. Avoid deltoid. Suggest using thigh.**
- **REFERENCE**: Pediatric Preparedness for Disasters and Terrorism: A National Consensus Conference, Executive summary 2003. Markenson D, Redlener I. AHRQ, DHHS, EMSC Program of the Maternal and Child Health Resources Services Administration

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DRUG REFERENCE

PREGNANCY CATEGORY RATINGS FOR DRUGS 3

CLASSIFICATION OF THERAPEUTIC INTERVENTIONS IN CPR AND ECC 4

ACTIVATED CHARCOAL 5
ADENOSINE 6
ALBUTEROL 7
AMINOPHYLLINE 8
AMIODARONE 9
AMYL NITRITE, SODIUM NITRITE, SODIUM THIOSULFATE (CYANIDE ANTIDOTE KIT) 10
ASPIRIN 11
ATROPINE SULFATE 12-13
Ipratropium Bromide 14

CALCIUM CHLORIDE / CALCIUM GLUCONATE 15

DEXAMETHASONE SODIUM PHOSPHATE 16
DEXTROSE 17
DIAZEPAM 18
DIAZOXIDE 19
DILTIAZEM HCL 20
DIPHENHYDRAMINE 21
DOPAMINE 22

EPINEPHRINE 23-24

FUROSEMIDE 25

GLUCAGON 26
GLUCOSE - ORAL 27
GYCOPROTEIN IIb / IIIa INHIBITORS 28

HEPARIN SODIUM 29

INSULIN (REGULAR INSULIN, NPH, ULTRALENTE, HUMULIN, OTHERS) 30

LACTATED RINGERS 31
LIDOCAINE HCL (2%) 32-33
LORAZEPAM 34

MAGNESIUM SULFATE 35
MANNITOL 20% 36
MEPERIDINE 37
METOPROLOL 38
MIDAZOLAM 39
MORPHINE SULFATE 40

NALOXONE 41
NERVE AGENT ANTIDOTES (AUTO-INJECTORS) 42-45
NITROGLYCERIN 46
NITROPASTE 47

OXYGEN 48

DRUG REFERENCE (CON'T)

PRALIDOXIME CHLORIDE 49
PROCAINAMIDE 50

SODIUM BICARBONATE 8.4% 51
STREPTOKINASE 52

TERBUTALINE 53
TETRACAINE 54
THIAMINE 55
TISSUE PLASMINOGEN ACTIVATOR (T-PA), 56

PREGNANCY CATEGORY RATINGS FOR DRUGS

Drugs have been categorized by the Food and Drug Administration (FDA) according to the level of risk to the fetus. These categories are listed for each herein under "Pregnancy Safety" and are interpreted as follows:

- **Category A**: Controlled studies in women fail to demonstrate a risk to the fetus in the first trimester, and there is no evidence of risk in later trimesters; the possibility of fetal harm appears to be remote.

- **Category B**: Either (1) animal reproductive studies have not demonstrated a fetal risk but there are no controlled studies in women or (2) animal reproductive studies have shown an adverse effect (other than decreased fertility) that was not confirmed in controlled studies on women in the first trimester and there is no evidence of risk in later trimesters.

- **Category C**: Either (1) studies in animals have revealed adverse effects on the fetus and there are no controlled studies in women or (2) studies in women and animals are not available. Drugs in this category should be given only if the potential benefit justifies the risk to the fetus.

- **Category D**: There is positive evidence of human fetal risk, but the benefits for pregnant women may be acceptable despite the risk, as in life-threatening diseases for which safer drugs cannot be used or are ineffective. An appropriate statement must appear in the "Warnings" section of the labeling of drugs in this category.

- **Category X**: Studies in animals and humans have demonstrated fetal abnormalities, there is evidence of fetal risk based on human experience, or both; the risk of using the drug in pregnant women clearly outweighs any possible benefit. The drug is contraindicated in women who are or may become pregnant. An appropriate statement must appear in the "Contraindications" section of the labeling of drugs in this category.

CLASSIFICATION OF THERAPEUTIC INTERVENTIONS IN CPR AND ECC

A system of classifying recommendations based on strength of the supporting scientific evidence was used.

- **Class I** - A therapeutic option that is usually indicated, always acceptable, and considered useful and effective.
- **Class II** - A therapeutic option that is acceptable, is of certain efficacy, and may be controversial.
- **Class IIa** - A therapeutic option for which the weight of evidence is in favor of its usefulness and efficacy.
- **Class IIb** - A therapeutic option that is not well established by evidence but may be helpful and probably is not harmful.
- **Class III** - A therapeutic option that is inappropriate, is without scientific supporting data, and may be harmful.

ACTIVATED CHARCOAL

Class

Adsorbent

Mechanism of Action

Adsorbs toxic substances from the GI Tract; Onset of action is immediate.

Indications

Most oral poisonings and medication overdoses; can be used after evacuation of poisons.

Contraindications

Oral administration to comatose patient; after ingestion of corrosives, caustics or petroleum distillates (ineffective and may induce vomiting); simultaneous administration with other oral drugs.

Adverse Reactions

May induce nausea and vomiting; may cause constipation; may cause black stools.

Drug Interactions

Bonds with and generally inactivates whatever it is mixed with, e.g., syrup of ipecac.

How supplied

25 gm (black powder) / 125 ml bottle (200 mg/ml)
50 gm (black powder) / 250 ml bottle (200 mg/ml)

Dosage and Administration

Note, if not **in Pre-mixed** slurry, dilute **with 1-part charcoal/ 4 parts water.**
Adult: 1-2 gm/kg PO or via NGT
Pediatric: 1-2 gm/kg PO or via NGT

Duration of action

depends upon GI function; will act until excreted.

Special Considerations

Often used in conjunction with magnesium citrate
Must be stored in a closed container
Does **not** adsorb cyanide, lithium, iron, lead and arsenic.

ADENOSINE

Class

Endogenous Nucleotide

Mechanism of action

Slows conduction time through the AV Node; can interrupt re-entrant pathways; slows heart rate; acts directly on sinus pacemaker cells. Is drug of choice for PSVT. Can be used diagnostically for stable, wide-complex tachycardias of unknown type after two doses of Lidocaine.

Indications

Conversion of **PSVT to sinus rhythm. May convert PSVT due to Wolff-Parkinson-White syndrome.**

Not effective m converting atrial fibrillation / flutter.

Contraindications

Second or third-degree " block or Sick Sinus Syndrome
Atrial flutter / atrial fibrillation
Ventricular Tachycardia
Hypersensitivity to adenosine

Adverse Reactions

Facial flushing, shortness of breath, chest pain, headache, paresthesia, diaphoresis, palpitations, hypotension, nausea, metallic taste.

Drug Interactions

Methylxanthines (theophylline-like drugs) antagonize the effects of adenosine.
Dipyridamole (Persantine) potentiates the effects of adenosine
Carbamazepine (Tegretol) may potentiate the AV Node blocking effects of adenosine.
May cause bronchoconstriction in asthmatic patients.

How Supplied

Three mg/ml in 2-ml flip-top vials for IV injection

Dosage and Administration

Adult: 6 mg over 1-3 seconds; If no response after 1-2 minutes, administer 12 mg over 1-3 seconds, Maximum total dose = 30 mgs.

Pediatric: 0.1 - 0.2 mg/kg rapid IV; maximum single dose = 12 mgs.

Duration of action

Onset and peak effects in seconds; duration 12 seconds.

Special Considerations

Short half-life limits side effects in most patients.
Pregnancy safety: Category C.

ALBUTEROL

Class

Sympathomimetic, bronchodilator.

Mechanism of **Action**

Selective b-2 agonist which stimulates adrenergic receptors of the sympathomimetic nervous system resulting in smooth muscle relaxation in the bronchial tree and peripheral vasculature.

Indications

Treatment of bronchospasm in patients with reversible obstructive airway disease **(COPD/asthma).** Prevention of exercise-induced bronchospasm.

Contraindications

Known prior hypersensitivity reactions to Albuterol.
Tachycardia dysrhythmias, especially those caused by digitalis.
Synergistic with other sympathomimetics

Adverse Reactions

Often dose-related and include restlessness, tremors, dizziness, palpitations, tachycardia, nervousness, peripheral vasodilatation, nausea, vomiting, hyperglycemia, increased blood pressure and paradoxical bronchospasm

Drug Interactions

Tricyclic antidepressants may potentiate vasculature effects.
Beta-blockers are antagonistic.
May potentiate hypokalemia caused by diuretics.

How Supplied

Solution for aerosolization: 0.5% (5 mg/ml)
Metered Dose Inhaler: 90 mcg/metered spray (17 gm canister with 200 inhalations)
Syrup: 2 mg/5 ml

Dosage and Administration

Adult: Administer 2.5 mg. Dilute 0.5 ml of 0.5% solution for inhalation with 2.5 ml normal saline in nebulizer and administer over 10-15 minutes.
MDI: 1-2 inhalations (90-180 mcg). Five minutes between inhalations
Pediatric: Administer solution of 0.01 - 0.03 ml (0.05 - 0.15 mg/kg/ dose diluted in 2 ml of 0.9% Normal Saline. May repeat every 20 minutes three times.

Duration of Action

Onset in 5-15 minutes with peak effect in 30-minutes - two hours and duration of 3-4 hours.

Special Considerations

Pregnancy Safety: Category C.
Antagonized by beta-blockers (e.g., Inderal, **Metoprolol**
May precipitate angina pectoris and dysrhythmias.
Should only be administered by inhalation methodology in pre-hospital management.

AMINOPHYLLINE

Class

Xanthine bronchodilator (theophylline derivative).

Mechanism of Action

Respiratory stimulator and bronchodilator.

Indications

Limited usefulness in EMS arena although may be used in refractory COPD patients; interfacility transfers; bronchospasm.

Contraindications

Allergy to xanthines, e.g., caffeine; cardiac dysrhythmias.

Adverse Reactions

Tachycardia, palpitations, PVCs, Angina pectoris, headache, seizure, nausea and vomiting.

Drug Interactions

Beta blockers may oppose effects; Barbiturates and phenytoin may decrease theophylline levels.

How Supplied

500 mg / 10 ml ampule; 500 mg / 20 ml ampule (preload) 25 mg/ml; 250 mg / ml ampule (preload).

Dosage and Administration

Loading dose (Adult): 5-6 mg / kg in 60-100 ml of diluent over 30 min. IV infusion not to exceed 20 mg/min.;

Loading dose (Pediatric): 5-6 mg / kg in 50-100 ml; diluent IV infusion.

Maintenance infusion

Adult: First 12 hours: 0.5-0.7 mg/kg/hour (lower doses for elderly, CHF, liver disease). Subsequent: 0.1-0.5 mg/kg/hour (based on serum aminophylline levels)

Pediatric: 1.0 mg/kg/hour.

Duration of Action

Onset less than 15 minutes; Duration 4.5 hours.

Special Considerations

Pregnancy safety: Category C;

Use with caution in patients with cardiovascular disease., hypertension or hepatic/renal disease.

Doses should be halved in patients already taking theophylline preparations.

Therapeutic to toxic ratio is narrow!

AMIODARONE

Class

Antidysrhythmic.

Mechanism of Action

Prolongation of Action Potential; non-competitive alpha and beta sympathetic blocking effects; Calcium channel blocking effects.

Indications

Suppression of Ventricular Fibrillation refractory to defibrillation and Lidocaine.
Suppression of Ventricular Tachycardia refractory to cardioversion and Lidocaine.

Contraindications

Second or Third Degree heart block..
Medication-induced Ventricular dysrhythmias.
Hypotension, Bradycardia, Torsades de Pointes.
Profound Sinus Bradycardia.

Adverse Reactions

Hypotension, Bradycardia, Pulseless Electrical Activity, Congestive Heart Failure.
Nausea, fever, abnormal Liver Function Tests, Thrombocytopenia.

Drug Interactions

Will precipitate with Sodium Bicarbonate: incompatible.
Compatible with: Dopamine, Dobutamine, Isoproterenol, Lidocaine, NTG, Norepinephrine, Phenylephrine, KCL, Procainamide.

How Supplied:

150 mg in 3 ml vials.

Dosage and Administration

Adult: 300 mg slow IV Push over 1-2 minutes in 10 **ml** Normal Saline, (For ACLS VF/ Pulseless VT)

IV Drip 0.5-1mg per minute. (For malignant ventricular arrhythmias) per ordering physician.

Duration of Action:

Onset: Within 5-15 minutes.
Peak Effect: Variable.
Duration: Variable

Special Considerations

Pregnancy safety: Category C
Maintain at room temperature and protect from light in storage (light protection not required during administration).
Hypotension usually responsive to slowing infusion rate, IV Normal Saline.
Administer cautiously in patients with Heart Failure or poor systolic function.
May be especially effective in high-risk patients with recent acute MI.

AMYL NITRITE, SODIUM NITRITE, SODIUM THIOSULFATE (CYANIDE ANTIDOTE KIT)

Class

Antidote

Mechanism of Action

Amyl Nitrite: affinity for cyanide ions; reacts with hemoglobin to form methemoglobin (low toxicity)

Sodium Nitrite: same as amyl nitrite

Sodium Thiosulfate: produces thiocyanate, which is then excreted

Indications

Cyanide or hydrocyanic acid poisoning.

Contraindications

Not applicable.

Adverse reactions

Excessive doses of amyl nitrite and sodium nitrite can produce severe, life-threatening methemoglobinemia. Use only recommended doses.

Drug Interactions

None.

How supplied

Amyl nitrite: in pledgettes similar to ammonia capsules.

Dosage and administration

Adult: Amyl nitrite: breathe 30 seconds out of every minute. Sodium Thiosulfate and sodium nitrite: IV per antidote kit directions.

Pediatric: Same as adult.

Duration of Action

Variable.

Special Considerations

Cyanide poisoning must be recognized quickly and treated quickly; if pulse persists, even in presence of apnea, prognosis is good with treatment. The antidote kit must be used in conjunction with administration of oxygen.

ASPIRIN

Class:

Platelet inhibitor, anti-inflammatory agent.

Mechanism of Action:

Prostaglandin inhibition.

Indications:

New onset chest pain suggestive of Acute Myocardial Infarction.
Signs and symptoms suggestive of recent cerebrovascular accident.

Contraindications:

Hypersensitivity.
Gastrointestinal bleeding.

Adverse Reactions:

Heartburn.
GI bleeding.
Nausea, vomiting.
Wheezing in allergic patients.
Prolonged bleeding.

Drug Interactions:

Use with caution in patients allergic to NSAIDS.

How Supplied:

160 mg or 325 mg tablets (chewable and standard).

Dosage and Administration:

160 mg or 325 mg PO.

Duration of Action:

Onset: 30-45 minutes.
Peak effect: variable.
Duration: Variable.

Special Considerations:

Pregnancy Safety: Category D.
Not recommended in pediatric population.

ATROPINE SULFATE

Class:

Anticholinergic agent.

Mechanism of Action:

Parasympatholytic: inhibits action of acetylcholine at postganglionic parasympathetic neuroeffector sites.

Increases heart rate in life-threatening bradydysrhythmias.

Indications:

Hemodynamically significant bradycardia.

Asystole.

Drug of choice for organophosphate poisoning.

Bronchospastic pulmonary disorders.

Contraindications:

Tachycardia.

Hypersensitivity.

Unstable cardiovascular status in acute hemorrhage and myocardial ischemia.

Narrow-angle glaucoma.

Adverse Reactions:

Headache, dizziness, palpitations, nausea and vomiting.

Tachycardia, dysrhythmias, anticholinergic effects (blurred vision, dry mouth, urinary retention).

Paradoxical bradycardia when pushed slowly or at low doses.

Flushed, hot dry skin.

Drug Interactions:

Potential adverse effects when administered with digoxin, cholinergics, physostigmine.

Effects enhanced by antihistamines, procainamide, quinidine, antipsychotics, benzodiazepines and antidepressants.

How Supplied:

Prefilled syringes: 1.0 mg in 10 ml of solution.

Nebulizer: 0.2% (1 mg in 0.5 ml) and 0.5% (2.5 mg in 0.5 ml).

Injection Solution as Sulfate: 0.5mg/ml (1ml); 1mg/ml (1ml); 0.1mg/ml (5ml,10ml); 0.4mg/ml (1ml, 20ml)

Autoinjectors: (See Nerve Agent Antidote)

Dosage and Administration:

Adult:

- **Bradydysrhythymias**: **0.5 - 1.0 mg IV every 3-5 minutes as needed to maximum total dose of 0.04 mg / kg. (may be given Endotracheally if IV not established: 2.0 mg followed by 2.0 ml of Normal Saline Solution).**
- **Asystole: 1.0 mg IV push every 3-5 minutes as needed to maximum total dose of 0.04 mg / kg (may be given Endotracheally if IV not yet established: 2.0 mg followed by 2.0 ml Normal Saline Solution).**

Pediatric:

ATROPINE SULFATE (cont.)

- **Bradydysrhythmias: 0.2 mg / kg IV / ET / IO (minimum single dose 0.1 mg, maximum single dose 1.0 mg). If administered via ET, follow with 2.0 ml sterile Normal Saline Solution.**

- **Asystole: Same as for Bradydysrhythmias: minimum dose 0.1 mg; maximum dose 0.5 mg for a child and 1.0 mg for adolescent.**

Duration of Action:

Onset: Immediate.
Peak Effect: Rapid to 1-2 minutes.
Duration: 2-6 hours.

Special Considerations:

Pregnancy Safety: Category C.
Moderate doses dilate pupils.

IPRATROPIUM BROMIDE

Class: Bronchodilator

Mechanism of Action: Blocks the action of acetycholine at the parasympathetic sites in bronchial smooth muscle causing bronchodilitation.

Indications: Used in bronchospasm especially associated with COPD, and emphysema.

Contraindications: Hypersensitivity to atropine or its derivatives**.**

Adverse Reactions:

Ipratropium is poorly absorbed from the lung, so systemic effects are rare.

>10% CNS: Dizziness, Headache, Nervousness
Respiratory: Cough

1-10% Cardiac: Hypotention, palpitations

How Supplied: Nebulizing Ampule: 0.02% (2.5ml)
Inhaler: 18mcg/actuation

Dosage and Administration:

Adult: 2-3 puffs via metered dose inhaler (MDI) tid-qid; maximum 12 puffs/day.
ALT: 500mcg **NEB** q 6-8hrs (may mix neb solution with Albuterol if used within 1 hour)

Pediatric: < 12 yo: 1-2 puffs(MDI) tid-qid; max: 8 puffs
ALT: 250mcg **NEB** q 6-8hrs (may mix neb solution with Albuterol if used within 1 hour)

Kinetics:

Onset: 1-3 minutes after administration
Peak effects: Within 1.5- 2 hours
Duration of Action: Up to 4-6 hours
T1/2: 2 hrs after inhalation

Special Considerations

Pregnancy Safety: Category B.

CALCIUM CHLORIDE / CALCIUM GLUCONATE

Class

Electrolyte.

Mechanism of Action

Increases cardiac contractile state (positive inotropic effect).

May enhance ventricular automaticity.

Indications

Hypocalcemia, magnesium sulfate overdose, hyperkalemia, calcium channel blocker toxicity.

Adjunctive therapy in treatment of insect bites and stings.

Contraindications

Hypercalcemia, VF during cardiac resuscitation; digitalis toxicity.

Adverse Reactions

Bradycardia, asystole, hypotension, peripheral vasodilation, metallic taste, local necrosis, coronary and cerebral artery spasm, nausea, vomiting.

Drug Interactions

May worsen dysrhythmias secondary to digitalis.

May antagonize effects of Verapamil.

Flush line before and after administration of sodium bicarbonate.

How Supplied

10% solution in 10 ml ampules, vials and prefilled syringes (100 mg/ ml).

Dosage and Administration

Adult: 2-4 mg/kg of 10% solution slowly IV over 5 minutes; may repeat in 10 minutes. (maximum: 1 gm dose)

Pediatric: 20 mg/kg/dose of 10% solution slow IV/ IO (maximum: 1 gm dose); (may repeat in 10 minutes.)

Duration of Action

Onset: 5-15 minutes.

Peak effects: 3-5 minutes.

Duration: 15-30 minutes but may persist for 4 hours (dose dependent).

Special Considerations

Pregnancy safety: Category C.

For pediatrics: if calcium gluconate is unavailable, 1-2 ml of 10% calcium chloride solution, diluted with IV fluid, may be substituted.

DEXAMETHASONE SODIUM PHOSPHATE

Class

corticosteroid.

Mechanism of Action

Suppresses acute and chronic inflammation; immunosuppressive effects.

Indications

Anaphylaxis, asthma, spinal cord injury, croup, elevated intracranial pressure (prevention and treatment), as an adjunct to treatment of shock.

Contraindications

Hypersensitivity to product.

Adverse Reactions

Hypertension, sodium and water retention, GI bleeding, TB.
None from single dose.

Drug Interactions

Calcium
Metaraminol.

How Supplied

100 mg/ 5 ml vials or 20 mg/1 ml vials.

Dosage and Administration

Adult: 10-100 mg IV (1 mg/kg slow IV bolus). (considerable variance through Medical Control).

Pediatric: 0.25-1.0 mg/kg/dose IV, IO, IM.

Duration of Action

Onset: Hours.
Peak effects: 8-12 hours.
Duration of action: 24-72 hours.

Special Consideration

Pregnancy safety: unknown.
Protect medication form heat.
Toxicity and side effects with long-term use.

DEXTROSE

Class

Carbohydrate, hypertonic solution.

Mechanism of Action

Rapidly increases serum glucose levels.
Short-term osmotic diuresis.

Indications

Hypoglycemia, altered level of consciousness, coma of unknown etiology, seizure of unknown etiology, status epilepticus (controversial).

Contraindications

Intracranial hemorrhage, delirium tremens, ineffective without thiamine,

Adverse Reactions

Extravasation leads to tissue necrosis.
Warmth, pain, burning, thrombophlebitis, rhabdomyositis.

Drug Interactions

Sodium bicarbonate, coumadin.

How Supplied

25 gm/ 50 ml pre-filled syringes (500 mg/ml)

Dosage and Administration

Adult: 12.5-25 gram slow IV; may be repeated as necessary.
Pediatric: 0.5-1 gm/kg/dose slow IV; may be repeated as necessary.

Duration of Action

Onset: less than 1 minute.
Peak effects: variable.
Duration: Variable.

Special Considerations

Administer thiamine prior to D50 in known alcoholic patients.
Draw blood sugar before administering.
Do not administer to patients with known CVA unless hypoglycemia documented.

DIAZEPAM

Class

Benzodiazepine, sedative-hypnotic, anticonvulsant.

Mechanism of Action

Potentiates effects of inhibitory neurotransmitters.
Raises seizure threshold.
Induces amnesia and sedation.

Indications

Acute anxiety states, acute alcohol withdrawal, muscle relaxant, seizure activity, agitation.
Analgesia for medical procedures (fracture reduction, cardioversion).
Delirium tremens.

Contraindications

Hypersensitivity, glaucoma. coma, shock, substance abuse, head injury.

Adverse Reactions

Respiratory depression, hypotension, drowsiness, ataxia, reflex tachycardia, nausea, confusion, thrombosis and phlebitis.

Drug Interactions

Incompatible with most drugs, fluids.

How Supplied

10 mg/5 ml prefilled syringes, ampules, vials and Tubex..

Dosage and Administration

Seizure activity: Adult: 5-10 mg IV q 10-15 minutes prn (5 mg over 5 min.)(maximum dose = 30 mgs.)
Seizure activity: Pediatric: 0.2-0.3 mg/kg/dose IV every 15-30 minutes (no faster than 3 mg over 5 minutes) (max. = 10 mg/kg). Rectal diazepam: 0.5 mg/kg via 2" rectal catheter and flush with 2-3 ml air after administration.
Sedation for cardioversion: 5- 15 mg IV over 5-10 minutes prior to cardioversion.

Duration of Action

Onset: 1-5 minutes.
Peak effect: minutes.
Duration: 20-50 minutes.

Special Considerations

Pregnancy safety: Category D
Short duration of anticonvulsant effect.
Reduce dose 50% in elderly patient.

DIAZOXIDE

Class

Vasodilator.

Mechanism of Action

Non-diuretic antihypertensive; arteriolar vasodilatation.

Indications

Hypertensive crisis, especially in pre-eclampsia.

Contraindications

Hypotension, dissecting aortic aneurysm, labor.

Adverse Reactions

Reflex tachycardia, angina, cerebral ischemia, CVA, dysrhythmia, hyperglycemia, nausea, vomiting.

Drug Interactions

Incompatible with heat, light or acid solutions.

How Supplied: 5 mg/ml 20 ml ampules.

Dosage and Administration

Adult: 5 mg/kg IV push over 10-30 seconds.

Pediatric: 5 mg/kg IV push over 10-30 seconds.

Duration of Action

Onset: Immediate.

Peak effects: 5 minutes.

Duration of action: 3-12 hours.

Special Considerations

Administer only to patient in supine position.

Extravasation can cause tissue necrosis.

DILTIAZEM HCL

Class:

Calcium channel blocker.

Mechanism of Action:

Block influx of calcium ions into cardiac muscle: prevents spasm of coronary arteries.

Arterial and venous vasodilator.

Reduces preload and afterload.

Reduces myocardial oxygen demand.

Indications:

Control of rapid ventricular rates due to atrial flutter, atrial fibrillation, PSVT.

Angina pectoris.

Contraindications:

Hypotension, sick sinus syndrome, second or third degree AV block

Cardiogenic shock.

Wide-complex tachycardias.

Adverse Reactions:

Bradycardia, second or third-degree AV blocks, chest pain, CHF, syncope.

V-Fib, V-tach, nausea, vomiting, dizziness, dry mouth, dyspnea, headache.

Drug Interactions:

Caution in patients using medications that affect cardiac contractility.

In general, should not be used in patients on Beta-blockers.

How Supplied:

25 mg / 5 ml vial; 50 mg / 10 ml vial.

Non - refrigerated: LYO-JECT syringe.

Dosage and Administration:

Adult: Initial bolus: 0.25 mg/ kg (average dose 20 mg) IV over two (2) minutes. If inadequate response, may re-bolus in 15 minutes: 0.35 mg / kg IV over two (2) minutes. Maintenance infusion of 5-15 mg / hour.

Pediatric: not recommended.

Duration of Action:

Onset: 2-5 minutes.

Peak effect: Variable.

Duration: 1-3 hours.

Special Considerations:

Pregnancy safety: category C.

Use in caution in patients with renal or hepatic dysfunction.

PVCs may be noted at time of conversion of PSVT to sinus rhythm.

DIPHENHYDRAMINE

Class

Antihistamine; anticholinergic.

Mechanism of Action

Blocks cellular histamine receptors; decreases vasodilation; decreases motion sickness. Reverses extrapyramidal reactions.

Indications

Symptomatic relief of allergies, allergic reactions, anaphylaxis, acute dystonic reactions (phenothiazines).

Blood administration reactions; used for motion sickness, hay fever.

Contraindications

Asthma, glaucoma, pregnancy, hypertension, narrow angle glaucoma, infants, patients taking

Monoamine Oxidase Inhibitors.

Adverse Reactions

Sedation, hypotension, seizures, visual disturbances, vomiting, urinary retention, palpitations, dysrhythmias, dry mouth and throat, paradoxical CNS excitation in children.

Drug Interactions

Potentiates effects of alcohol and other anticholinergics, may inhibit corticosteroid activity, MAOIs prolong anticholinergic effects of diphenhydramine.

How Supplied

Tablet: 25, 50 mg; Capsules: 25, 50 mg.

50 or 100 mg prefilled syringes, vials (IV or IM); elixir 12.5 mg/5 ml.

Dosage and Administration

Adult: 25 - 50 mg IM or IV or P.O.

Pediatric: 1-2 mg/kg IV, IO slowly or IM. If given PO: 5 mg./ kg./ 24 hours.

Duration of Action

Onset: 15-30 minutes.

Peak effect: 1 hour.

Duration: 3-12 hours.

Special Considerations

Not used in infants or in pregnancy: Category B.

If used in anaphylaxis, will be in conjunction with epinephrine, steroids.

DOPAMINE

Class

Sympathomimetic, inotropic agent.

Mechanism of Action

Immediate metabolic precursor to Norepinephrine. Increases systemic vascular resistance, dilate renal and splanchnic vasculature. Increases myocardial contractility and stroke volume.

Indications

Cardiogenic, septic or spinal shock, hypotension with low cardiac output states. Distributive shock.

Contraindications

Hypovolemic shock, pheochromocytoma, tachydysrhythmias, VF.

Adverse Reactions

Cardiac dysrhythmias, hypertension, increased myocardial oxygen demand, extravasation may cause tissue necrosis.

Drug Interactions

Incompatible in alkaline solutions.
MAOIs will enhance effects of dopamine.
Beta blockers may antagonize effects of dopamine.
When administered with Phenytoin: may cause hypotension, bradycardia and seizures.

How Supplied

200 mg / 5 ml - 400 mg / 5 ml prefilled syringes, ampules for IV infusion.
400 mg in 250 ml D5W premixed solutions.

Dosage and Administration

Adult: 2- 20 mcg / kg / min. (Rate determined by physician).
Pediatric: 2 - 20 mcg / kg / min. (Rate determined by physician).

Duration of Action

Onset: 1-4 minutes.
Peak Effect: 5-10 minutes.
Duration: Effects cease almost immediately after infusion shut off.

Special Considerations

Pregnancy safety not established.
Effects are dose-dependent
Dopaminergic response: 2-4 mcg / kg / min.: dilates vessels in kidneys; inc. urine output.
Beta-adrenergic response: 4- 10 mcg / kg / min.: Increased chronotropy and inotropy
Adrenergic response: 10-20 mcg / kg / min.: Primarily alpha stimulant / vasoconstriction.
Greater than 20 mcg / kg / min.: reversal of renal effects / override alpha effects.
Always monitor drip rate.
Avoid extravasation injury.

EPINEPHRINE

Class: Sympathomimetic.

Mechanism of Action

Direct acting alpha and beta agonist
Alpha: bronchial, cutaneous, renal and visceral arteriolar vasoconstriction.
Beta 1: positive inotropic and chronotropic actions, increases automaticity.
Beta 2: bronchial smooth muscle relaxation and dilation of skeletal vasculature
Blocks histamine release.

Indications

Cardiac arrest, asystole, PEA, VF unresponsive to initial defib.
Severe bronchospasm, asthma, bronchiolitis.
Anaphylaxis, acute allergic reactions.

Contraindications

Hypertension, hypothermia, pulmonary edema, coronary insufficiency, hypovolemic shock.

Adverse Reactions

Hypertension, dysrhythmias, pulmonary edema, anxiety, psychomotor agitation, nausea, angina, headache, restlessness.

Drug Interactions

Potentiates other sympathomimetics.
Deactivated by alkaline solutions.
MAOIs may potentiate effects of epinephrine.

How Supplied

1 mg / ml (1:1,000) ampules and 0.1 mg / ml (1:10,000) prefilled syringes.
Auto-injectors: EPI-Pen: 0. 3 mg / ml
EPI-Pen Jr.: 0.15mg/ml

Dosage and Administration

Adult

Allergic reactions and asthma: 0.3 - 0.5 mg (0.3 - 0.5 ml 1:1000) SC
Anaphylaxis: 0.3 - 0.5 mg (3- 5 ml 1:10,000) IV

Cardiac: (asystole, PEA, VF)
1 mg IV push (1:10,000) every 3- 5 minutes
Endotracheal: 2.0 - 2.5 mg (1:1,000) every 3- 5 minutes in 10ml NS

Pediatric

Allergic reactions and asthma: 0.01 mg/kg (0.01 mL/kg 1:1000) SC to maximum of 0.5 mg.
Cardiac: (asystole, PEA, VF)
IV, IO: Standard initial dose: 0.01 mg/kg (1:10,000, 0.1mL/kg)
ET: 0.1 mg/kg (1:1,000, 0.1mL/kg)
Second and subsequent doses: 0.1 mg/kg (1:1000, 0.1mL/kg)

EPINEPHRINE

Duration of Action

Onset: Immediate.
Peak Effects: Minutes.
Duration: Several minutes.

Special Considerations

Pregnancy safety: category C.
Syncope in asthmatic children.
If given ET, may dilute in sterile NS (10 ml in adults).

FUROSEMIDE

Class

Loop diuretic.

Mechanism of Action

Inhibits electrolyte reabsorption and promotes excretion of sodium, potassium, chloride.

Indications

CHF; Pulmonary edema, hypertensive crisis.

Contraindications

Hypovolemia, anuria, hypotension (relative contraindication); hypersensitivity, hepatic coma.

Adverse Reactions

May exacerbate Hypovolemia, hypokalemia, ECG changes, dry mouth, hypochloremia, hyponatremia, hyperglycemia (due to hemoconcentration).

Drug Interactions

Lithium toxicity may be potentiated by sodium depletion.

Digitalis toxicity may be potentiated by potassium depletion.

How Supplied

100 mg / 5 ml, 20 mg / 2 ml, 40 mg / 4 ml vials.

Dosage and Administration

Adult: 0.5-1.0 mg / kg injected slowly IV.

Pediatric: 1 mg / kg / dose IV, IO.

Duration of Action

Onset: 5 minutes.

Peak Effects: 20-60 minutes.

Duration: 4-6 hours.

Special Considerations

Pregnancy safety: Category C.

Ototoxicity and deafness can occur with rapid administration.

Should be protected from light.

GLUCAGON

Class

Hyperglycemic agent, pancreatic hormone, insulin antagonist.

Mechanism of Action

Increases blood glucose by stimulating glycogenesis.
Unknown mechanism of stabilizing cardiac rhythm in beta-blocker overdose.
Minimal positive inotrope and chronotrope.
Decreases GI motility and secretions.

Indications

Altered level of consciousness when hypoglycemia is suspected.
May be used as inotropic agent in beta-blocker overdose.

Contraindications

Hyperglycemia, hypersensitivity.

Adverse Reactions

Nausea, vomiting.
Tachycardia, hypertension.

Drug Interactions

Incompatible in solution with most other substances.
No significant drug interactions with other emergency medications.

How Supplied

1 mg ampules (requires reconstitution with diluent provided)

Dosage and Administration

Adult: 0.5 - 1 mg IM, SC, or slow IV; may repeat q 20 minutes PRN.
Pediatric: 0.03 - 0.1 mg / kg / dose (not to exceed 1 mg) q 20 min. IM, IO, SC, slow IV.

Duration of Action

Onset: I minute.
Peak effect: 30 minutes.
Duration: Variable (generally 9-17 minutes).

Special Considerations

Pregnancy safety: Category C.
Ineffective if glycogen stores depleted.
Should always be used in conjunction with 50% dextrose whenever possible.
If patient does not respond to second dose glucagon, 50% dextrose must be administered.

GLUCOSE - ORAL

Class

Hyperglycemic.

Mechanism of Action

Provides quickly absorbed glucose to increase blood glucose levels.

Indications

Conscious patients with suspected hypoglycemia.

Contraindications

Decreased level of consciousness, nausea, vomiting.

Adverse Reactions

Nausea, vomiting.

Drug Interactions

None.

How Supplied

Glucola: 300 ml bottles.

Glucose pastes and gels in various forms.

Dosage and Administration

Adult: Should be sipped slowly by patient until clinical improvement noted.

Pediatric: Same as adult.

Duration of Action

Onset: Immediate.

Peak Effect: Variable.

Duration: Variable.

Special Considerations

As noted in indications section.

GLYCOPROTEIN IIb / IIIa INHIBITORS

Class

Chimeric monoclonal antibody fragment specific for platelet glycoprotein IIb/IIIa receptors.

Mechanism of Action

Blocks Platelet aggregation and thrombus formation

Indications

Adjunct to percutaneous transluminal angioplasty.
Adjunct to thrombolytic agents.
Unstable angina not responsive to conventional medical therapy when percutaneous angioplasty is planned within 24 hours.

Contraindications

Active internal hemorrhage.
Clinically significant hemorrhage (GI, GU) within last 6 weeks.
Cerebrovascular accident within past 2 years.
Bleeding disorders.
Thrombocytopenia (low platelets / < 100,000)
Major surgery or trauma within last 6 weeks.
Intracranial tumor, A/V malformation or aneurysm.
Severe Hypertension, Vasculitis.
Use of Dextran before PTCA or intent to use Dextran during PTCA.
Hypersensitivity.

Adverse Reactions

Major bleeding.
Intracranial bleeding.
Thrombocytopenia.

Drug Interactions

Oral anticoagulants contraindicated.
Concurrent Dextran contraindicated.
Concurrent Heparin will increase risk of bleeding.

How Supplied

Intravenous doses (bolus / infusion), variable depending upon Brand utilized.

Dosage and Administration

Variable depending upon Brand utilized.

Duration of Action

Onset: Variable: 1.5 - 2.5 Hours.
Peak Effect: Variable: 2 - 3 Hours.
Duration: 2 Hours - 2 Days.

Special Considerations

Major bleeding in 14% of coronary angioplasty patients.
Bleeding from open areas may occur (catheter site).
Pregnancy Category: C

HEPARIN SODIUM

Class

Anticoagulant.

Mechanism of Action

Prevents conversion of fibrinogen to fibrin and affect clotting factors: IX, XI, XII, plasmin.

Does not lyse existing clots.

Indications

Prophylaxis and treatment of : venous thrombosis, pulmonary embolus, coronary occlusion, disseminated intravascular coagulation (DIC), post-operative thrombosis.

To maintain patency of IV injection devices and indwelling catheters.

Contraindication

Hypersensitivity.

Patients on antiplatelet drugs (relative contraindication).

Adverse Reactions

Hemorrhage, thrombocytopenia, allergic reactions (chills, fever, back pain).

Drug Interactions

Salicylates, some antibiotics and quinidine may increase risk of bleeding.

How Supplied

Heparin lock flush solutions in 10 and 100-unit / ml ampules and prefilled syringes.

1,000 - 40,000 units / ml ampules.

Dosage and Administration

Adult: Loading dose: 80 units / kg IV; maintenance dose: 18 units / kg / hour IV.

Pediatric: Loading dose: 50 u / kg IV; maintenance dose: 7.5 units / kg / hour IV.

Duration of Action

Onset: Immediate.

Peak Effect: Variable.

Duration: 4 hours after continuous infusion discontinued.

Special Considerations

May be neutralized with protamine sulfate at 1 mg protamine / 100 u Heparin: give slowly IV over 1-3 minutes.

INSULIN

Class

Antidiabetic.

Mechanism of Action

Allows glucose transport into cells of all tissues; converts glycogen to fat; produces intracellular shift of potassium and magnesium to reduce elevated serum levels of these electrolytes.

Indications

Not used in emergency pre-hospital setting.
Diabetic ketoacidosis or other hyperglycemic state.
Hyperkalemia. (Insulin and D50 used together to lower hyperkalemic state).
Non-ketotic hyperosmolar coma.

Contraindications

Hypoglycemia, hypokalemia.

Adverse Reactions

Hypokalemia, hypoglycemia,, weakness, fatigue, confusion, headache, tachycardia, nausea, diaphoresis.

Drug Interactions

Incompatible in solution with all other drugs..
Corticosteroids, dobutamine, epinephrine and thiazide diuretics decrease the hypoglycemic effects of insulin.
Alcohol and salicylates may potentiate the effects of insulin.

How Supplied

10 ml Vials of 100 Units / ml.

Dosage and Administration

Dosage adjusted relative to blood sugar levels.
May be given SC, IM or IV.
Standard doses for diabetic coma

Adult: 10-25 units Regular insulin IV, followed by infusion of 0.1 units / kg / hour.
Pediatric: 0.1 - 0.2 units / kg / hour IV or IM followed by infusion: 50 units of regular insulin mixed in 250 ml of NS (0.2 units / ml), at a rate of 0.1 - 0.2 units / kg / hour.

Duration of Action

Onset: Minutes
Peak Effect: Approximately 1 hour (short-acting); 3-6 hours (intermediate-acting); 5-8 hours (long-acting).
Duration: Approximately 6-8 hours (short-acting); 24 hour (intermediate-acting); 36 hour (long-acting).

Special Considerations

Insulin is drug of choice for control of diabetes in pregnancy.
Usually require refrigeration.
Most rapid absorption if injected in abdominal wall; next most rapid absorption: arm; slowest absorption if injected into the thigh.

LACTATED RINGERS

Class: Isotonic crystalloid

Mechanism of Action: Volume Replacement

.

Indications: Hypovolemic Shock

Contraindications: Congestive Heart failure, Renal Failure

Adverse Reactions: Rare

Drug Interactions: None

HOW SUPPLIED: IV INFUSION

Dosage and Administration:

Adult: (Systolic <90 mmHG) Infuse wide open until systolic pressure of 100mmHG is obtained.
(Systolic 100 or > infuse at a rate of 100 ml/hr.

Pedi: 20 ml/kg repeated as required based on hemodynamic response

LIDOCAINE HCL (2%)

Class

Antidysrhythmic.

Mechanism of Action

Decreases automaticity by slowing the rate of spontaneous Phase 4 depolarization.

Indications

Suppression of ventricular dysrhythmias (V-tach, VF, PVCs).
Prophylaxis against recurrence after conversion from V-tach, VF.

Contraindications

Second degree and third degree blocks in absence of artificial pacemaker).
Hypotension.
Stokes Adams Syndrome.

Adverse Reactions

Slurred speech, seizures, altered mental status, confusion, lightheadedness, blurred vision, bradycardia.

Drug Interactions

Apnea induced with succinylcholine may be prolonged with high doses of Lidocaine.
Cardiac depression may occur in conjunction with IV Dilantin.
Procainamide may exacerbate the CNS effects.
Metabolic clearance decreased in patients with liver disease or those patients taking beta-blockers.

How Supplied

100 mg in 5 ml solution prefilled syringes.
1 and 2 gram additive syringes.
100 mg in 5 ml solution ampules.
1 and 2 gram vials in 30 ml of solution.

Dosage and Administration

Adult:

Cardiac arrest VT/ VF: 1.5 mg / kg IV push; repeat q 3-5 minutes to maximum dose of 3 mg/kg. After conversion to NSR, begin drip at 2-4 mg / min.

VT with pulse: 1-1.5 mg / kg IV Push; then 0.50 - 0.75 mg / kg q 5-10 min. to max. of 3 mg/kg. Start drip at 2-4 mg/min. ASAP.

PVCs with pulse: 0.5-1.5 mg/kg IV Push; additional boluses of 0.5-1.5 mg/kg q 5-10 min. to max. of 3 mg/kg. Start drip at 2-4 mg/ min. ASAP.

VF prophylaxis: 0.5 mg/kg IV Push; additional boluses 0.5 mg/kg in 8-10 minutes up to 2 mg/kg. Start drip at 2-4 mg/min. ASAP.

IM dose: 300 mg (4 mg/kg) of 10% solution.

Pediatric:

VF or Pulseless V-tach: 1 mg/kg IV / IO per dose. Infusion: 20-50 mcg/kg/min.

PVCs with pulse: 1 mg/kg IV / IO per dose. Infusion: 20-50 mcg/kg/min.

Duration of Action

Onset: 1-5 minutes.
Peak Effect: 5-10 minutes.
Duration: Variable. (15 min. - 2 hours).

LIDOCAINE HCL (2%) (cont.)

Special Considerations

Pregnancy safety: Category B.

Reduce maintenance infusions by 50% if patient is over 70 years of age, has liver disease, or is in CHF or shock.

A 75-100 mg bolus maintains levels for only 20 minutes.

If bradycardia occurs with PVCs, always treat the bradycardia with atropine, Isoproterenol or both.

Exceedingly high doses of Lidocaine can result in coma or death.

Avoid Lidocaine for reperfusion dysrhythmias after thrombolytic therapy.

Cross-reactivity with other forms of local anesthetics.

LORAZEPAM

Class

Benzodiazepine; sedative; anticonvulsant.

Mechanism of Action

Anxiolytic, anticonvulsant and sedative effects; suppresses propagation of seizure activity produced by foci in cortex, thalamus and limbic areas.

Indications

Initial control of status epilepticus or severe recurrent seizures.
Severe anxiety.
Sedation.

Contraindications

Acute narrow-angle glaucoma.
Coma, shock or suspected drug abuse.

Adverse Reactions

Respiratory depression, apnea, drowsiness, sedation, ataxia, psychomotor impairment, confusion.
Restlessness, delirium.
Hypotension, bradycardia.

Drug Interactions

May precipitate CNS depression if patient is already taking CNS depressant medications.

How Supplied

2 and 4 mg / ml concentrations in 1 ml vials.

Dosage and Administration

Note: When given IV or IO, must dilute with equal volume of sterile water or sterile saline; When given IM, Lorazepam is not to be diluted.
Adult: 2-4 mg slow IV at 2 mg / min. or IM; may repeat in 15-20 minutes to maximum dose of 8 mg. For sedation: 0.05 mg / kg up to 4 mg IM.
Pediatric: 0.05 - 0.20 mg / kg slow IV, IO slowly over 2 minutes or IM; may repeat in 15-20 minutes to maximum dose of 0.2 mg / kg.

Duration

Onset of action: 1-5 minutes.
Peak effect: variable.
Duration of action: 6-8 hours.

Special Considerations

Pregnancy safety: Category D.
Monitor BP and respiratory rate during administration.
Have advanced airway equipment readily available.
Inadvertent arterial injection may result in vasospasm and gangrene.
Lorazepam expires in 6 weeks if not refrigerated.

Note From Drug Control Program: Re: Storage of Lorazepam.
According to stability information, Lorazepam injection requires refrigeration and should be stored at 2 - 8º C (35 - 45º F). Lorazepam injection should be protected from light, which can be accomplished by retaining the vial in the carton until ready for use. In addition, freezing of the injection should be avoided. Ambulances are required to ensure stability of all drug products stored on site. Those ambulances unable to meet the above-mentioned storage conditions should refrain from using Lorazepam. For further information, contact the Drug Control Program at (617) 983-6700 or the Office of Emergency Medical Services at (617) 753-7300.

MAGNESIUM SULFATE

Class

Electrolyte.

Mechanism of Action

Reduces striated muscle contractions and blocks peripheral neuromuscular transmission by reducing acetylcholinesterase release at the myoneural junction; manages seizures in toxemia of pregnancy; induces uterine relaxation; can cause bronchodilation after beta-agonists and anticholinergics have been used.

Indications

Seizures of eclampsia (Toxemia of pregnancy).
Torsades de Pointes.
Hypomagnesemia.
TCA overdose-induced dysrhythmias.
Digitalis-induced dysrhythmias.
Class IIa agent for refractory VF and VT after administration of Lidocaine doses.

Contraindications

Heart blocks.
Renal diseases.

Adverse Reactions

Respiratory and CNS depression.
Hypotension, cardiac arrest and asystole may occur.
Facial flushing, diaphoresis, depressed reflexes.
Circulatory collapse.

Drug Interactions

May enhance effects of other CNS depressants.
Serious changes in overall cardiac function may occur with cardiac glycosides.

How Supplied

2 ml and 20 ml vials of a 50% solution.

Dosage and Administration

Adult: Seizure activity associated with pregnancy: 1-4 gm IV push over 3 minutes. For Torsades de Pointes or Refractory VF/VT: 1-2 grams IV push over 1-2 minutes.

Pediatric: Not recommended.

Duration of Action

Onset: Immediate.
Peak effect: variable.
Duration: 3-4 hours.

Special Considerations

Pregnancy safety: Recommended that drug not be given in the 2 hours before delivery, if possible.
IV calcium gluconate or calcium chloride should be available as antagonist if needed.
The “cure” for toxemia is delivery of the baby.
Use with caution in patients with renal failure.
Magnesium sulfate is being used for acute MI patients in some systems under Medical Direction.

MANNITOL 20%

Class

Osmotic diuretic.

Mechanism of Action

Promotes the movement of fluid form the intracellular space to the extracellular space.

Decreases cerebral edema and intracranial pressure.

Promotes urinary excretion of toxins.

Indications

Cerebral edema.

Reduce intracranial pressure for certain cause (space-occupying lesions).

Rhabdomyolysis (myoglobinuria).

Blood transfusion reactions.

Contraindications

Hypotension, renal failure, electrolyte depletion, dehydration, intracranial bleeding.

Severe CHF with pulmonary edema

hyponatremia.

Adverse Reactions

CHF, pulmonary edema, hypertension, nausea, vomiting, headache, seizures, chest pain, tachycardia. Electrolyte depletion, dehydration, hypotension, sodium depletion.

Drug Interactions

May precipitate digitalis toxicity in when given concurrently.

How Supplied

250 ml and 500 ml of a 20% solution for IV infusion (200 mg / ml)

25% solution in 50 ml for slow IV push.

Dosage and Administration

Adult: 0.50g - 2 g / kg IV infusion over 15-30 minutes; may repeat after 5 minutes if no effect.

Pediatric: 0.5 - 1g / kg / dose IV, IO infusion over 30-60 minutes; may repeat after 30 minutes if no effect.

Duration of Action

Onset: 1-3 hours for diuretic effect; 15 minutes for reduction of intracranial pressure.

Peak effect: variable.

Duration: 4-6 hours for diuretic effect; 3-8 hours for reduction of ICP.

Special Considerations

Pregnancy safety: Category C.

May crystallize at temperatures below 7.8 degrees Centigrade.

In-line filter should always be used.

Effectiveness depends upon large doses and an intact blood-brain barrier.

Usage and dosages in emergency care are controversial.

MEPERIDINE

Class

Opioid Analgesic

Mechanism of Action

Synthetic opioid agonist that acts on opioid receptors to produce analgesia, euphoria, respiratory and physical depression; a schedule II drug with potential for physical dependency and abuse.

Indications

Analgesia for moderate to severe pain.

Contraindications

Hypersensitivity to narcotic agents.
Diarrhea caused by poisoning.
Patients taking MAOIs.
During labor or delivery of a premature infant.
Undiagnosed abdominal pain or head injury.

Adverse Reactions

Respiratory depression, sedation, apnea, circulatory depression, dysrhythmias, shock.
Euphoria, delirium, agitation, hallucinations, visual disturbances, coma.
Seizures, headache, facial flushing.
Increased ICP, nausea, vomiting.

Drug Interactions:

Do not give concurrently with MAOIs (even with a dose in the last 14 days!).
Exacerbates CNS depression when given with these medications.

How Supplied

50 / ml in 1 ml pre-filled syringes and Tubex.

Dosage and Administration

Adult: 50-100 mg IM, SC or 25 - 50 mg slowly IV.
Pediatric: 1-2 mg / kg / dose IV, IO, IM, SC.

Duration of Action

Onset: IM: 10-45 minutes; IV: immediate.
Peak effect: 30-60 minutes.
Duration: 2-4 hours.

Special Considerations

Pregnancy safety: Category C.
Use with caution in patients with asthma and COPD.
May aggravate seizures in patients with known convulsive disorders.
Naloxone should be readily available as antagonist.

METOPROLOL

Class: Antianginal; Antihypertensive Agent; Beta Blocker

Mechanism of Action: Selective inhibitor of beta1-adrenergic receptors; completely blocks beta1 receptors , with little or no effect on beta 2 receptors at doses <100 mg;

Indications: Treatment of hypertension and angina pectoris; prevention of myocardial infarction, atrial fibrillation, flutter, symptomatic treatment of hypertrophic subaortic stenosis; to reduce increased sympathetic stimuli in acute MI.

Contraindications: Hypersensitivity to metoprolol or any component of the formulation; sinus bradycardia; heart block greater than first degree (except in patients with a functioning artificial pacemaker); cardiogenic shock; uncompensated cardiac failure; pregnancy (2nd and 3rd trimesters)

Adverse Reactions:

Respiratory: Bronchospasm
Cardiovascular: Bradycardia, palpitations, edema, congestive heart failure, reduced peripheral circulation.
Central nervous system: Drowsiness, insomnia.

Drug Interactions: Drugs which slow AV conduction (**digoxin**): effects may be additive with beta-blockers.
Glucagon: Metoprolol may blunt the hyperglycemic action of glucagon. **Verapamil or diltiazem** may have synergistic or additive pharmacological effects when taken concurrently with beta-blockers; avoid concurrent I.V. use.

How Supplied: Metoprolol tartrate, is a selective $beta_1$-adrenoreceptor blocking agent, available as 50- and 100-mg tablets for **oral** administration and in 5-ml (1mg/ml) ampuls for **intravenous** administration.

Dosage and Administration:

Adults:
I.V.: **Hypertension**: Has been given in dosages 1.25-5 mg every 6-12 hours in patients unable to take oral medications
Myocardial infarction (acute): I.V.: 5 mg every 5-10 minutes up to 3 doses in early treatment of myocardial infarction.

Duration of Action: Peak antihypertensive effect:
Oral: Within 1.5-4 hours
Duration: 10-20 hours
Half-life: 3-4 hours; End-stage renal disease: 2.5-4.5 hours

Special Considerations:
Pregnancy Safety: Category C (manufacturer); D (2nd and 3rd trimesters - expert analysis)

Not recommended in pediatric population. The safety and effectiveness of **Metoprolol** have not been established in children

MIDAZOLAM

Class

Short-acting benzodiazepine CNS depressant.

Mechanism of Action

Anxiolytic and sedative properties similar to other benzodiazepines.
Memory impairment.

Indications

Sedation, Anxiolytic prior to endotracheal or nasotracheal intubation.
Administer for conscious sedation.

Contraindications

Glaucoma, shock, coma, alcohol intoxication, overdose patient.
Depressed vital signs.
Concomitant use with other CNS depressants, barbiturates, alcohol, narcotics.

Adverse Reactions

Hiccough, cough, over-sedation, nausea, vomiting, injection site pain, headache, blurred vision.
Hypotension, respiratory depression and arrest.

Drug Interactions

Should not be used in patients who have taken CNS depressant.

How Supplied

2, 5, 10 ml vials (1 mg / ml).
1, 2 , 5, 10 ml vials (5 mg/ ml).

Dosage and Administration

Adult: 0.5 - 2.5 mg slow IV push;
(may be repeated to total maximum: 0.1 mg / kg).

Pediatric: To facilitate intubation: Medical control may order:

(6 months- 5 years) Use of Midazolam (~~Versed~~) 0.05-0.1 mg/kg IV maximum dose of 5 mg.

(6-12 year old) Use of Midazolam (~~Versed~~) 0.1 mg/kg IV maximum dose of 8 mg.

WMD: (See APPENDIX Dosing Table)

Duration of Action

Onset: 1-3 minutes IV and dose dependent.
Peak effect: variable.
Duration: 2-6 hours and dose dependent.

Special Considerations

Pregnancy safety: category D.
Administer immediately prior to intubation procedure.
Requires continuous monitoring of respiratory and cardiac function.
Never administer as IV bolus.

MORPHINE SULFATE

Class

Opioid analgesic. (Schedule II drug).

Mechanism of Action

Alleviates pain through CNS actions
Suppresses fear and anxiety centers in brain.
Depresses brain stem respiratory centers.
Increases peripheral venous capacitance and decreases venous return.
Decreases preload and afterload, decreasing myocardial oxygen demand.

Indications

Analgesia for moderate to severe acute and chronic pain (use with caution).
Severe CHF, pulmonary edema.
Chest pain associated with acute MI.

Contraindications

Head injury, exacerbated COPD, depressed respiratory drive, hypotension.
Undiagnosed abdominal pain, decreased level of consciousness.
Suspected hypovolemia.
Patients who have taken MAOIs within past 14 days.

Adverse Reactions

Respiratory depression, hypotension, decreased level of consciousness, nausea, vomiting.
Bradycardia, tachycardia, syncope, facial flushing, euphoria, bronchospasm, dry mouth.

Drug Interactions

Potentiates sedative effects of phenothiaxines.
CNS depressant may potentiate effects of morphine.
MAOIs may cause paradoxical excitation.

How Supplied

10 mg in 1 ml of solution, ampules and Tubex syringes.

Dosage and Administration

Adult: 1-3 mg IV, IM, SC every 5 minutes titrated to maximum of 10 mg.
Adult: **Morphine 0.1mg/kg to a maximum of 10mg IV/IM/SC**

~

Pediatric: 0.1 - 0.2 mg / kg / dose IV, IO, IM, SC every 5 minutes titrated to max. of 5 mg.

Duration of Action

Onset: Immediate.
Peak effect: 20 minutes.
Duration: 2 - 7 hours.

Special Considerations

Pregnancy safety: Category C.
Morphine rapidly crosses the placenta.
Safety in neonate not established.
Use with caution in geriatric population and those with COPD, asthma.
Vagotonic effect in patient with acute inferior MI (bradycardia, heart block).
Naloxone should be readily available as antidote.

NALOXONE

Class

Narcotic antagonist.

Mechanism of Action

Competitive inhibition at narcotic receptor sites.
Reverse respiratory depression secondary to depressant drugs.
Completely inhibits t effect of morphine.

Indications

Opiate overdose, coma.
Complete or partial reversal of CNS and respiratory depression induced by opioids
- Narcotic agonist
  - Morphine, heroin, hydromorphone (Dilaudid), methadone.
  - Meperidine (Demerol), Paregoric, Fentanyl (Sublimase).
  - Oxycodone (Percodan), codeine, propoxyphene (Darvon).
- Narcotic agonist and antagonist
  - Butorphanol (Stadol).
  - Pentazocine (Talwin).
  - Nalbuphine (Nubain).

Decreased level of consciousness.
Coma of unknown origin.

Contraindications

Use with caution in narcotic-dependent patients.
Use with caution in neonates of narcotic-addicted mothers.

Adverse Reactions

Withdrawal symptoms in the addicted patient.
Tachycardia. hypertension, dysrhythmias, nausea, vomiting, diaphoresis.

Drug Interactions

Incompatible with bisulfite and alkaline solutions.

How Supplied

0.02 mg / ml (neonate); 0.4 mg/ml, 1 mg/ml ; 2.0 mg / 5 ml ampules; 2 mg/5 ml prefilled syringe.

Dosage and Administration

Adult: 0.4 - 2.0 mg IV, IM, SC, Nasal via atomizer or ET (diluted); min. recommended = 2.0 mg.; repeat at 5 minute intervals to 10 mg maximum dose. (Medical Control may request higher amounts). Infusion: 2 mg in 500 ml of D5W (4 mcg/ml), infuse at 0.4 mg / hr (100 ml/hour).

Pediatric: 0.1 mg / kg / dose IV, IM, SC, ET (diluted); maximum of 0.8 mg; if no response in 10 minutes, administer an additional 0.1 mg / kg /dose.

Duration of Action

Onset: within 2 minutes.
Peak effect: variable.
Duration: 30-60 minutes.

Special Considerations

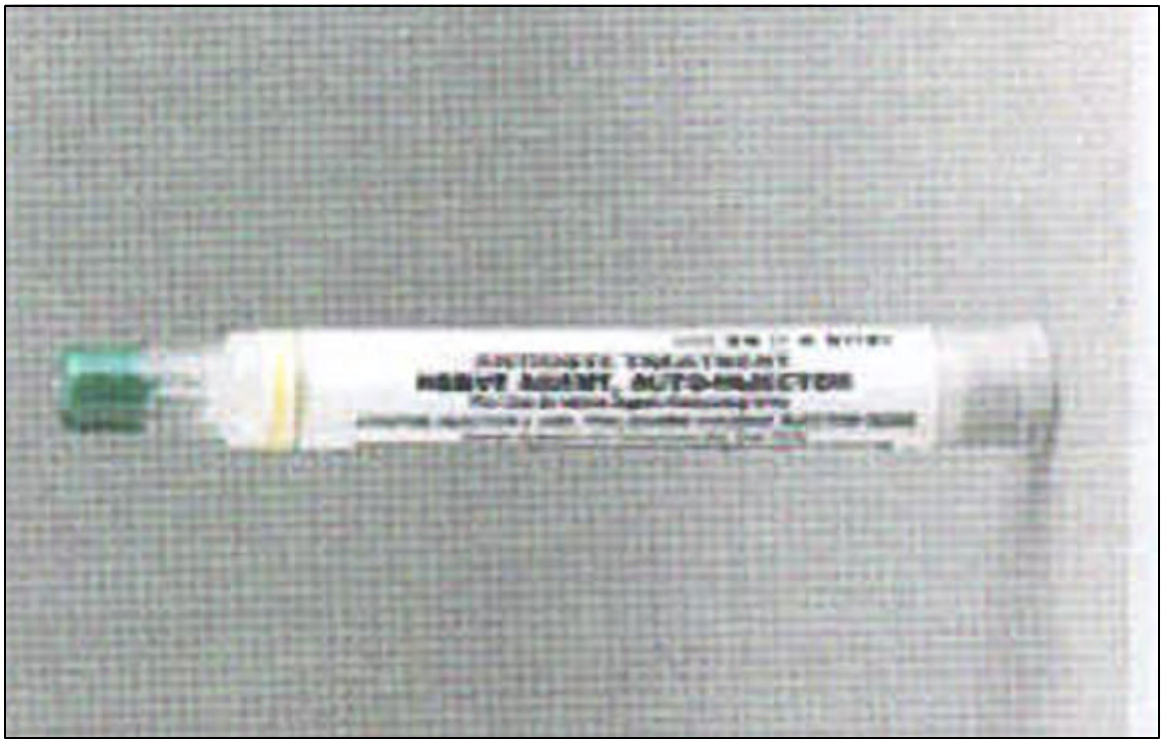
Pregnancy safety: category B.
Seizures without causal relationship have been reported.
May not reverse hypotension.
Use caution when administering to narcotic addicts (violent behavior, etc.).

NERVE AGENT ANTIDOTES (AUTO-INJECTORS)

1. MARK 1 KIT: Nerve Agent Antidote Kit

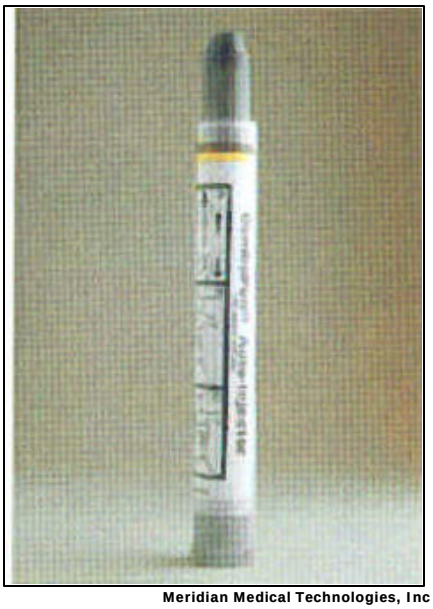
Each **MARK 1 KIT** contains 1- Atropine, (2 mg/0.7 ml) and 1- Pralidoxime Chloride (600-mg/2 **ml**) (2-PAMCL)

2. (ATNAA):Antodote Treatment Nerve Agent Auto-Injector
Each Dual Chamber (ATNAA) Auto-Injector delivers 2.1 mg Atropine in 0.7 ml and 600 mg Pralidoxime Chloride in 2 ml sequentially using a single needle.



NERVE AGENT ANTIDOTES (AUTO-INJECTORS)

3. ATOX ComboPen: Delivers 220 mg Obidoxime Chloride and 2 mg Atropine in 2 ml. (Available outside the U.S.,pending FDA approval later this year.)



Meridian Medical Technologies, Inc

4. Pralidoxime Chloride Injection (2-Pam) Delivers 600mg Pralidoxime Chloride in 2 ml.

Meridian Medical Technologies, Inc

NERVE AGENT ANTIDOTES (AUTO-INJECTORS)

5. DIAZEPAM AUTO-INJECTOR: CONVULSANT ANTIDOTE NERVE AGENT (CANA): Each **CANA Autoinjector** contains 10mg diazepam in 2ml.

Meridian Medical Technologies, Inc

6. AtroPen® Autoinjector: (Pediatric)
Delivers 0.25 mg Atropine Sulfate equivalent in 0.3ml.

Meridian Medical Technologies, Inc.

NERVE AGENT ANTIDOTES (AUTO-INJECTORS)

7. Pediatric AtroPen® Autoinjector: Three strengths of ATROPEN are available in color coded containers: 0.5mg (blue); 1.0mg (Dark Red) **or** 2.0 mg (Green) Each ATROPEN delivers atropine in in 0.7 ml. of sterile solution.

Adults and children weighing over 90 lbs (generally over 10 years of age) 2 mg AtroPen® (GREEN LABEL)
Children weighing 40 lbs to 90 lbs (generally 4 to 10 years of age) 1 mg AtroPen® (DARK RED LABEL)
Children weighing 15 lbs to 40 lbs (generally 6 months to 4 years of age) 0.5 mg AtroPen® (BLUE LABEL)

Intramuscular solution from 1 gram vial of prali ter or normal saline for a concentration of 300 mg/ml.

Intravenous: 1 gram vial of pralidoxime (2-PAM) diluted with 20 ml of sterile water or normal saline. Add to 100 ml IV bag of normal saline. Adult dosing is 1 gram infused over at least 30 minutes. More rapid dosing is associated with hypertension and paralysis. Slow infusion if hypertension develops.

PREPARATION OF WEIGHT BASED DOSING USING MARK I KITS

Under sterile conditions, clean 10 ml sterile water or sterile saline vial top with isopropyl alcohol. Withdraw entire contents of vial and discard. Swab injection surface of the autoinjector with isopropyl alcohol wile autoinjector is still in protective plastic safety case to prevent inadvertent firing. Remove autoinjector and firmly press autoinjector against surface of emptied sterile vial until all contents are discharged. Label vial as atropine or pralidoxime. One vial will now contain 2 mg atropine in 0.7 ml dilutent (2.9 mg/ml) and the other has 600 mg pralidoxime in 2ml dilutent (300 mg/ml). The pediatric dose should then be drawn up in a syringe with a filter needle (autoinjector may discharge a plug of rubber into the vial) and needle changed for injection.

NITROGLYCERIN

Class

Vasodilators.

Mechanism of Action

Smooth muscle relaxant acting on vascular, bronchial, uterine and intestinal smooth muscle.

Dilation of arterioles and veins in the periphery, reduces preload and afterload, decreases the work load of the heart and, thereby, myocardial oxygen demand.

Indications

Acute angina pectoris.

Ischemic chest pain.

Hypertension.

CHF, pulmonary edema.

Contraindications

Hypotension, hypovolemia.

Intracranial bleeding or head injury.

Adverse Reactions

Headache, hypotension, syncope, reflex tachycardia, flushing.

Nausea, vomiting, diaphoresis, muscle twitching.

Drug Interactions

Additive effects with other vasodilators.

Incompatible with other drugs IV.

How Supplied

Tablets: 0.15 mg (1/400 grain); 0.3 mg (1/200 grain); 0.4 mg (1/150 grain); 0.6 mg (1/100 grain).

NTG spray: 0.4 mg - 0.8 mg under the tongue.

NTG IV (TRIDIL).

Dosage and Administration

Adult:

Tablets: 0.3 - 0.4 mg SL; may repeat in 3-5 minutes to maximum of 3 doses.

NTG spray: 0.4 mg under the tongue; 1-2 sprays.

NTG IV infusion: 5 ug / min.; increase by 5-10 ug / min. every 5 minutes until

desired effect.

Pediatric: not recommended.

Duration of Action

Onset: 1-3 minutes.

Peak effect: 5-10 minutes.

Duration: 20-30 minutes or. if IV, 1-10 minutes after discontinuation of infusion.

Special Considerations

Pregnancy safety: category C.

Hypotension more common in geriatric population.

NTG decomposes if exposed to light or heat.

Must be kept in airtight containers.

Active ingredient may have a stinging effect when administered SL.

NITROPASTE

Class: Vasodilator

Mechanism of Action: Smooth muscle relaxant acting on vascular, bronchial, uterine and intestinal smooth muscle. Dilation of arterioles and veins in the periphery, reduces preload and afterload, decreases the work load of the heart and, thereby, myocardial oxygen demand.

Indications: Angina pectoris and chest pain associated with acute MI, CHF/PE; Hypertension (HTN).

Contraindications: Hypotension, hypovolemia, Intracranial bleeding or head injury.

Adverse Reactions: Headache, hypotension, syncope, reflex tachycardia, flushing. Nausea, vomiting, diaphoresis, muscle twitching.

How Supplied: Topical Ointment: (Nitrol â) 2% [20 mg/g] (30g, 60g)

Dosage and Administration

Adult: For CHF/PE; HTN

Paste: Apply 1 inch, cover with plastic wrap and secure with tape.

Pediatric: not recommended.

Duration of Action

Onset: 30 minutes.
Peak effect: Variable.
Duration: 18-24 hours.

Special Considerations

Pregnancy safety: Category C.

Apply in thin uniform layer on non-hairy area.
1 inch equals approximately 15 mg nitroglycerin.
Avoid using fingers to spread paste.
Store past in cool place with tube tightly capped.
Erratic absorption rates quite common.

OXYGEN

Class

Naturally occurring atmospheric gas.

Mechanism of Action

Reverses hypoxemia.

Indications

Confirmed or expected hypoxemia.
Ischemic chest pain.
Respiratory insufficiency.
Prophylactically during air transport.
Confirmed or suspected carbon monoxide poisoning.
All other causes of decreased tissue oxygenation.
Decreased level of consciousness.

Contraindications

Certain patients with COPD, emphysema who will not tolerate Oxygen concentrations over 35%.
Hyperventilation.

Adverse Reactions

Decreased level of consciousness and respiratory depression in patients with chronic CO2 retention.
Retrolental fibroplasia if given in high concentrations to premature infants. (maintain 30-40% 02)

Drug Interactions

None.

How Supplied

Oxygen cylinders (usually green and white) of 100% compressed oxygen gas).

Dosage and Administration

Adult:

Cardiac arrest and Carbon Monoxide poisoning: 100%.
Hypoxemia: 10-15 L/ min. via non-rebreather.
COPD: 0-2 L/ min. via nasal cannula or 28-35% venturi mask. Be prepared to provide ventilatory support if higher concentrations of oxygen needed.

Pediatric: Same as for adult with exception of premature infant.

Duration of Action

Onset: Immediate.
Peak effect: not applicable.
Duration: Less than 2 minutes.

Special Considerations

Be familiar with liter flow and each type of delivery device used.
Supports possibility of combustion.

PRALIDOXIME CHLORIDE

Class

Cholinesterase reactivator.

Mechanism of Action

Reactivation of cholinesterase to effectively act as an antidote to organophosphate pesticide poisoning. This action allows for destruction of accumulated acetylcholine at the neuromuscular junction.

Indications

As an antidote in the treatment of poisoning by organophosphate pesticides and chemicals.

In the pre-hospital arena, is used when atropine is or has become ineffective in management of organophosphate poisoning.

Contraindications

Use with caution in patients with reduced renal function.

Patients with myasthenia gravis and organophosphate poisoning.

Adverse Reactions

Dizziness, blurred vision, diplopia, headache, drowsiness, nausea, tachycardia, hyperventilation, muscular weakness, excitement and manic behavior

Drug Interactions

No direct drug interactions, however, patients with organophosphate poisoning should not be given barbiturates, morphine, theophylline, aminophylline, succinylcholine, reserpine and phenothiazines.

How Supplied

Emergency Single Dose Kit containing:

- One 20 ml vial of 1 gram sterile Protopam Chloride.
- One 20 ml ampule of sterile diluent.
- Sterile, disposable 20 ml syringe.
- Needle and alcohol swab.

Dosage and Administration

NOTE: If Protopam is to be used, it should be administered almost simultaneously with atropine.

Adult: Initial dose of 1-2 grams as an IV infusion with 100 ml saline over 15-30 minutes.

Pediatric: 20-40 mg / kg as IV infusion over 15-30 minutes.

Doses may be repeated every 1 (one) hour if muscle weakness persists.

If IV administration is not feasible, IM or SC injection may be utilized.

Autoinjectors: (See Nerve Agent Antidote)

Duration of Action

Onset: Minutes

Peak effects: Variable.

Duration: Variable

Special Considerations

Pregnancy safety: unknown.

Treatment will be most effective if given within a few hours after poisoning.

Cardiac monitoring should be considered in all cases of severe organophosphate poisoning.

PROCAINAMIDE

Class

Antidysrhythmic Class Ia.

Mechanism of Action

Suppresses phase IV depolarization in normal ventricular muscle and Purkinje fibers, reducing automaticity of ectopic pacemakers; suppresses reentry dysrhythmias by slowing intraventricular conduction.

Indications

Suppress PVCs refractory to Lidocaine.
Suppress VT with a pulse refractory to Lidocaine.
PSVTs with wide-complex tachycardia of unknown origin (drug of choice when associated with WP).

Contraindications

Second and Third Degree block.
Torsades de Pointes.
Lupus.
Digitalis toxicity.
Myasthenia gravis.

Adverse Reactions

PR, QRS, and QT widening, AV Block, cardiac arrest, hypotension, seizures.
Nausea, vomiting, reflex tachycardia, PVCs, VT, VF.
CNS depression, confusion.

Drug Interaction

None with other emergency drugs.

How Supplied

1 gram in 10 ml vial (100 mg / ml).
1 gram in 2 ml vials (500 mg / ml) for infusion.

Dosage and Administration

Adult: 20-30 mg / min.; maximum total dose is 17 mg / kg. Maintenance infusion: 1-4 mg / min.
Pediatric: 2-6 mg / kg IV, IO at less than 20 mg / min.; maximum dose is 17 mg / kg. Maintenance infusion: 20-80 micrograms/kg/min.

Duration of Action

Onset: 10-30 minutes.
Peak effect: Variable.
Duration: 3-6 hours.

Special Considerations

Discontinue infusion if hypotension develops, the QRS complex widens by 50% of its original width or a total of 17 mg / kg has been administered or if the dysrhythmia is suppressed.
Pregnancy safety: Category C.
Potent vasodilating and inotropic effects.
Hypotension with too rapid an infusion.
Carefully monitor vital signs and ECG.
Administer cautiously to patients with renal, hepatic or cardiac insufficiency.
Administer cautiously to patients with asthma or digitalis-induced dysrhythmias.

SODIUM BICARBONATE 8.4%

Class Buffer, alkalinizer.

Mechanism of Action

Reacts with hydrogen ions to form water and carbon dioxide thereby acting as a buffer for metabolic acidosis.

Indications

Known pre-existing bicarbonate-responsive acidosis.
Upon return of spontaneous circulation after long arrest interval.
TCA overdose.
Hyperkalemia.
Phenobarbital overdose.
Alkalinization for treatment of specific intoxications.

Contraindications

Metabolic and respiratory alkalosis.
Hypocalcemia and hypokalemia.
Hypocloremia secondary to GI loss and vomiting.

Adverse Reactions

Metabolic alkalosis, hypokalemia, hyperosmolarity, fluid overload.
Increase in tissue acidosis.
Electrolyte imbalance and tetany, seizures.
Tissue sloughing at injection site.

Drug Interactions

May precipitate in calcium solutions.
Half-lives of certain drugs may increase through alkalinization of the urine.
Vasopressors may be deactivated.

How Supplied

50 mEq in 50 ml of solvent.

Dosage and Administration

Adult: 1 mEq / kg IV; may repeat with 0.5 mEq / kg every 10 minutes.
Pediatric: same as for adult.

Adult infusion: 1 – 4 amps in 1 litre D5W or NS, rate determined by sending physician.
Pediatric infusion: same as for adult.

Duration of Action

Onset: 2-10 minutes.
Peak effect: 15-20 minutes.
Duration: 30-60 minutes.

Special Considerations

Pregnancy safety: Category C.
Must ventilate patient after administration.
Whenever possible, blood gas analysis should guide use of bicarbonate.
Intracellular acidosis may be worsened by production of carbon dioxide.
May increase edematous states.
May worsen CHF.

STREPTOKINASE

Class Thrombolytic agent.

Mechanism of Action

Combines with plasminogen to produce an activator complex that converts free plasminogen to the proteolytic enzyme plasmin. Plasmin degrades fibrin threads as well as fibrinogen, causing clot lysis.

Indications

Acute evolving MI.
Massive pulmonary emboli.
Arterial thrombosis and embolism.
To clear arteriovenous cannulas.

Contraindications

Hypersensitivity.
Active bleeding, recent surgery (within 2-4 weeks), recent CVA.
Prolonged CPR.
Intracranial or intraspinal neoplasm, arteriovenous malformation or surgery.
Recent significant trauma (particularly head trauma).
Uncontrolled hypertension.

Adverse Reactions

Bleeding (GU, GI, intracranial, other sites).
Allergic reactions, hypotension, chest pain.
Reperfusion Dysrhythmias.
Abdominal pain.

Drug Interactions

Aspirin may increase risk of bleeding as well as improve outcome..
Heparin and other anticoagulants may increase risk of bleeding as well as improve outcome.

How Supplied

250,000, 750,000, 1.5 Million IU vials.

Dosage and Administration

NOTE: Reconstitute by slowly adding 5 ml sodium chloride or D5W, directing stream to side of vial instead of into powder. Gently roll and tilt vial for reconstitution; Dilute slowly to 45 ml total.
Adult: 500,000 - 1,500,000 IU diluted to 45 ml IV over one (1) hour.
Pediatric: safety not established.

Duration of Action

Onset: 10 - 20 minutes. (fibrinolysis 10-20 minutes; clot lysis: 60 - 90 minutes).
Peak effects: Variable.
Duration: 3-4 hours (prolonged bleeding times up to 24 hours).

Special Considerations

Pregnancy safety: Category A.
Do not administer IM injections to patients receiving thrombolytics.
Obtain blood sample for coagulation studies prior to administration.
Carefully monitor vital signs.
Observe patient for bleeding.

TERBUTALINE

Class

Sympathomimetic bronchodilator.

Mechanism of Action

Selective beta-2 adrenergic receptor activity resulting in relaxation of smooth muscles of the bronchial tree and peripheral vasculature. Minimal cardiac effects.

Indications

Bronchial asthma.

Reversible bronchospasm associated with exercise, chronic bronchitis, and emphysema.

Contraindications

Hypersensitivity.

Tachydysrhythmias.

Adverse Reactions

Usually transient and dose-related, restlessness, apprehension, palpitations, tachycardia.

Chest pain, coughing, bronchospasm, nausea, facial flushing.

Drug Interactions

Cardiovascular effects exacerbated by other sympathomimetics.

MAOIs may potentiate dysrhythmias.

Beta blockers may antagonize terbutaline.

How Supplied

MDI: 200 mcg / metered spray.

Parenteral: 1 mg / ml ampule.

Dosage and Administration

Adult: 0.25 mg SC; may repeat in 15-30 minutes to maximum dose of 0.5 mg in 4 hours period. 400 mcg (two inhalations by MDI) every 4-6 hours; allow 1-2 minutes between inhalations.

Pediatric: Not recommended for children under 12 years of age. 0.01 mg / kg / dose SC every 15-20 minutes PRN to maximum 0.25 mg dose. 0.03 - 0.05 mg / kg in 1.25 ml saline for aerosolization every 4 hours.

Duration of action

Onset: SC: 15-30 minutes; MDI 5-30 minutes.

Peak effect: Variable.

Duration: SC: 1.5-4 hours; MDI: 3-6 hours.

Special Considerations

Pregnancy safety: Category B.

Carefully monitor vital signs.

Use with caution in patients with cardiovascular disease or hypertension.

Patient should receive oxygen before and during bronchodilator administration.

TETRACAINE

Class: Local Anesthetic

Mechanism of Action: Blocks the initiation and conduction of nerve impulses

Indications: Topically applied local anesthetic for eye examination

Contraindications: Hypersensitivity to ester anesthetics; Not to be applied in large amounts or to Infants of less than 1 year old.

Adverse Reactions: 1-10% Dermal: Angioedema, burning, contact dermatitis, stinging.
< 1% : Methemoglobinemia in infants

How Supplied: Ophthalmic: 0.5% [5mg/ml] (1ml, 2ml, 15ml)

Dosage and Administration:

Adult: Ophthalmic Solution: Instill 1-2 drops

Pediatric: Safety and efficacy have not been established.

Kinetics:
Onset: Within 60 seconds.

Special Considerations

Pregnancy category C

Storage Store in a light resistant container

Stability: Lasts 6 months refrigerated; Lasts 4 weeks at room temperature: Discard if solution discolors (should be clear)

Caution in Child < 6 years old

THIAMINE

Class

Vitamin (B1)

Mechanism of Action

Combines with ATP to form thiamine pyrophosphate coenzyme, a necessary component for carbohydrate metabolism. The brain is extremely sensitive to thiamine deficiency.

Indications

Coma of unknown origin.
Delirium tremens.
Beriberi.
Wernicke's encephalopathy.

Contraindications

None

Adverse Reactions

Hypotension from too rapid injection or too high a dose.
Anxiety, diaphoresis, nausea, vomiting.
Rare allergic reaction.

Drug Interactions

Give thiamine before glucose under all circumstances.

How Supplied

1,000 mg in 10 ml vial (100 mg / ml).

Dosage and Administration

Adult: 100 slow IV or IM.
Pediatric: 10-25 mg slow IV or IM.

Duration of Action

Onset: Rapid.
Peak effects: variable.
Duration: Dependent upon degree of deficiency.

Special Considerations

Pregnancy safety: Category A.
Large IV doses may cause respiratory difficulties.
Anaphylaxis reactions reported.

TISSUE PLASMINOGEN ACTIVATOR (T-PA)

Class

Thrombolytic agent.

Mechanism of Action

Binds to fibrin-bound plasminogen at the clot site, converting plasminogen to plasmin. Plasmin digests the fibrin strands of the clot restoring perfusion.

Indications

Acute evolving myocardial infarction.
Massive pulmonary emboli.
Arterial thrombosis and embolism.
To clear arteriovenous cannulas.

Contraindications

Recent sugary (within three weeks).
Active bleeding, recent CVA, prolonged CPR,, intracranial or intraspinal surgery.
Recent significant trauma, especially head trauma.
Uncontrolled hypertension (generally BP over 200 mm Hg.).

Adverse Reactions

GI, GU intracranial and other site bleeding.
Hypotension, allergic reactions, chest pain, abdominal pain, CVA.
Reperfusion dysrhythmias.

Drug Interactions

Acetylsalicylic acid may increase risk of hemorrhage.
Heparin and other anticoagulants may increase risk of hemorrhage.

How Supplied

20 mg with 20 ml diluent vial.
50 mg with 50 ml diluent vial.

Dosage and Administration

Adult: 10 mg bolus IV over 2 minutes; then 50 mg over one hour, then 20 mg over the second hour and 20 mg over the third hour for a total dose of 100 mg. (other doses may be prescribed through Medical Direction.
Pediatric: safety not established.

Duration of Action

Onset: clot lysis most often within 60-90 minutes.
Peak effect: variable.
Duration: 30 minutes with 80% cleared within 10 minutes.

Special Considerations

Pregnancy safety: contraindicated.
Closely monitor vital signs.
Observe for bleeding.
Do not give IM injection to patient receiving T-PA.

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